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MAMMALIA PLACENTALIA.

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1853.

Subclass *PLACENTALIA.*

Order RODENTIA.

Family *Leporidæ* (Hares, Rabbits, Pikas).

Genus *Lepus.*

Dental formula:—$i\,\frac{2-2}{1-1}$, $p\,\frac{3-3}{2-2}$, $m\,\frac{3-3}{3-3}=28$.

1914. The skeleton of a Hare (*Lepus timidus*, fœm.).

The vertebral formula is: 7 cervical, 12 dorsal, 7 lumbar, 3 sacral, 16 caudal. The seventh cervical is perforated, like the rest, by the vertebral arteries. The spine of the tenth dorsal is vertical, and the spines of the other trunk-vertebræ converge towards it. The anapophyses begin to be developed on the eighth, and the metapophyses on the ninth dorsal. The latter progressively increase and are continued throughout the lumbar region, where they arc of great length. The anapophyses assume the form of a ridge in the last dorsal and lumbar vertebræ, and subside in the penultimate lumbar. The diapophyses of the lumbar vertebræ are lengthened by coalesced pleurapophyses, and incline obliquely forwards and downwards. The hypapophyses are of remarkable length in the first three lumbar vertebræ. Seven pairs of ribs directly join the sternum, which consists of six bones. There are no clavicles. The supraspinal space is less deep and extensive than the infraspinal one: the spine itself is continued into an acromion at an unusual distance from the glenoid cavity, and a long retroverted process is given off near the end of the acromion. The coracoid is a compressed introverted process. The humerus is perforated between the condyles, not above the inner condyle. The radius and ulna are closely united together: the tibia and fibula have coalesced. In the fore-foot the first or innermost digit is short, but with the normal number of phalanges: the corresponding digit is not developed in the hind-foot.

Purchased.

1915. The skeleton of a Hare (*Lepus timidus*, mas).

The vertebral formula corresponds with that of the preceding skeleton: some of the caudal vertebræ are wanting. The transverse processes of the seventh cervical vertebra are notched, not perforated. The anapophyses of the lumbar vertebræ are more prolonged behind. The pelvis is narrower than in the female. In this skeleton are preserved not only the patellæ, but the fabellæ, which are three in number behind the knee-joint; one behind the inner condyle, one behind the outer condyle, and the third wedged between the latter condyle and the fibula.

Purchased.

1916. The skull of a Hare (*Lepus timidus*).

In few Mammalia is this part of the skeleton more remarkably modified than in the Hare. The superoccipital is surmounted by a square platform of bone—originally a distinct interparietal—the posterior angles of which project backwards in the form of two tubercles, from between which a vertical crest descends to the foramen magnum. The paroccipitals arch downwards and outwards in close connection with the descending process of the large subquadrate mastoid, which anchyloses with the petrosal and tympanic. The long bony 'meatus auditorius' ascends obliquely backwards—the direction in which this timid Rodent is most concerned in ascertaining the sounds that may warn it of an approaching enemy. The petromastoid is articulated in a peculiar manner to the squamosal, which bone retains more of its normal elementary shape as a diverging appendage than in most other Mammalia. After expanding beyond its zygomatic part to be applied to the parietal and alisphenoid, the squamosal resumes the form of a narrow thin plate of bone, which is applied to a shallow depression upon the mastoid, and thus clamps it, as it were, to its place. The frontal sends outwards a large aliform curved plate above each orbit, the extremities of which form postorbital and antorbital processes, the notches which divide the anterior from the posterior part of the frontal being unusually deep. The common outlet of the optic nerves extends forwards, so as to occasion a small vacuity at the back part of the interorbital septum. Each orbit presents a wide vacuity at its fore part, which leads into the lateral nasal cavity, bounded externally by the singularly reticulate nasal plate of the maxillary. The zygomatic arch, which is slightly curved downwards but scarcely at all outwards, developes a small prominence both from its front and hind extremity below the points of suspension. The articular surface for the lower jaw is broad and concave transversely, narrow and convex longitudinally; the squamosal presents a non-articular fossa behind it; a small hemispheric condyle of the lower jaw is applied to it. The bases of the sockets of the superior molars form a strong prominence in the orbit below the anterior vacuity. The nasal bones are remarkable both for their length and breadth: they extend further back than the long slender nasal processes of the premaxillaries. The bony palate is extensively encroached upon by the prepalatal apertures, which blend together to form a narrow heart-shaped vacuity with the apex directed forwards, largely exposing the vomer and the nasal cavities. The palatal processes of the maxillaries and palatines form a bridge, or platform, extending across opposite the three anterior molar teeth. The nasal processes of the palatines are of unusual height. The anterior incisors have the usual curvature and scalpriform structure of the Order, but are relatively smaller than in the more typical Rodents: they are longitudinally and deeply grooved anteriorly. The second incisors, peculiar to the Family *Leporidæ*, are small and simple, placed immediately behind the first, serving as a kind of anvil, or point of resistance, to receive the appulse of the summits of the inferior incisors. The angle of the lower jaw forms a broad compressed plate, with the lower border rounded and thickened, so as to project a little beyond both the outer and inner surface of the ascending plate: the outer ridge is continued forwards to the horizontal ramus, bounding the large masseteric fossa. The petrotympanics form 'bullæ osseæ.' The pterygoids develope both external and internal plates: the outer plate is widely perforated at its base; the inner plate terminates in a hamular process.

In the common foramen opticum, the wide palatal vacuities, the transversely extended

glenoid cavity, the inflection of the angle of the lower jaw, the superior number of premolars and upper incisors, the *Leporidæ*, as compared with other Rodents, offer the nearest approach to the Marsupial Order.

Hunterian.

The following bones are parts of the same skeleton of the *Lepus timidus*.

Hunterian.

1917. The atlas vertebra.

The transverse processes are perforated longitudinally by the vertebral arteries, which then perforate the neural arch. The hypapophysis, or so-called body, is ossified, and a small tubercle extends backwards from its under part.

1918. The penultimate lumbar vertebra.

The metapophyses, the anapophysial and hypapophysial ridges, are here shown.

1919. The right scapula.

The articular cavity for the humerus is broadest transversely.

1920. The right humerus.

In this may be noticed the intercondyloid perforation, and the entry of the medullary artery on the inner side of the distal third of the bone: the canal extends downwards.

1921. The right radius.

1922. The right ulna.

It is very slender, and is grooved anteriorly for the reception of the radius.

1923. The sacrum.

It here consists of four vertebræ by the anchylosis of the first caudal to the usual three confluent vertebræ. The neural spine of each projects distinctly, with a vacuity in the interspace leading to the neural canal.

1924. The right os innominatum.

The ischium sends a short and slightly curved process outwards above or anterior to the tuberosity.

1925. The right femur.

It has a third trochanter near the base of the great trochanter. The medullary artery pierces the inner side of the proximal third of the bone, and the canal extends downwards.

1926. The right tibia and fibula. The latter is anchylosed along its distal half to the tibia.

1927. The left astragalus.

1928. The metatarsal of the inner toe (*ii*) of the left foot.

It shows the process extended backwards from its proximal end to join the naviculare, which seems to represent a connate entocuneiform.

The following are parts of the same skeleton of the Russac, or Norway Hare, sometimes called the 'Irish Hare' (*Lepus variabilis*).

Presented by Sir P. de M. Grey Egerton, Bart., M.P., F.R.S.

1929. The skull.

The chief distinction between this skull and that of the *Lepus timidus*, is the extension of the points of the nasal processes of the premaxillaries beyond the hinder ends of the nasals.

1930. The vertebra dentata.

1931. The right scapula.

1932. The right humerus.

It shows the large intercondyloid perforation, and the same position and direction of the arterial medullary foramen as in the common Hare.

1933. The right radius.

1934. The right ulna.

1935. The right os innominatum.

1936. The right femur.

It shows the same position and direction of the canal for the medullary artery as in the common Hare.

1937. The right tibia and fibula.

Only the proximal third of the fibula is free, and projects upwards as a styliform process of the tibia.

1938. The right astragalus.

1939. The right os calcis.

1940. The right scaphoides.

1941. The bones of the left hind foot. The same process of the proximal end of the inner metatarsal (*ii*) takes the place of the inner cuneiform bone, as in the common Hare: a process of the scaphoid seems to represent a rudiment of the missing metatarsal.

1942. The left radius and ulna.

1943. The left humerus, longitudinally bisected.

1944. The left femur, longitudinally bisected.

1945. The left tibia, longitudinally bisected. It shows the complete coalescence of the fibula with the tibia, along their distal halves.

1946. The occipital segment of the skull of a Hare.

A bristle is passed through the sinus traversing the basioccipital by which the tympanic cavities intercommunicate.

Presented by Prof. Owen, F.R.S.

1947. The parietal and frontal segments of the same skull.

A bristle is passed through the short ecto-carotid canal, which pierces the outer and the back part of each alisphenoid, and also communicates with the interior of the cranium. The intercondyloid foramen is here pierced between the ento- and ecto-pterygoid processes of the sphenoid.

Presented by Prof. Owen, F.R.S.

1948. The occipital segment, with the right petrotympanic and mastoid, of a Hare.

A bristle is passed through the ento-carotid canal, which pierces the under part of the tym-

panic bulla, passes forwards between the tympanic and petrosal, and opens internally between the petrosal and the junction of the basioccipital with the basisphenoid.

Presented by Prof. Owen, F.R.S.

1949. The skeleton of a Rabbit (*Lepus cuniculus*), of the long-eared, or lop-eared, tame variety.

The vertebral formula is:—cervical 7, dorsal 12, lumbar 7, sacral 4, caudal 10. The auditory canal is larger, and opens more directly upwards, than in the Hare. The clavicular ossicles are preserved. The fore limbs are somewhat longer and stronger, the hind limbs shorter than in the Hare; but not so much so as to suggest the marked difference in the habits of the present burrowing species, as contrasted with the swift-running Hare.

The following are parts of the same skeleton of a Rabbit (*Lepus cuniculus*).

Hunterian.

1950. The skull.

1951. The atlas.

1952. The axis.

1953. An anterior dorsal vertebra.

1954. The sacrum, which consists of four anchylosed vertebræ.

1955. The right scapula.

1956. The right humerus.

1957. The right radius, ulna, carpus, metacarpus, and some of the phalanges.

1958. The left os innominatum.

1959. The right femur.

1960. The left tibia, fibula, tarsus, metatarsus, and some of the phalanges.

1961. The skull of a Rabbit (*Lepus cuniculus*). *Hunterian.*

1962. The skull of a Rabbit (*Lepus cuniculus*); the long-eared variety.

Presented by William Home Clift, Esq.

1963. The skull of a Rabbit (*Lepus cuniculus*). *Presented by Henry Cline, Esq.*

1964. The skull of a Rabbit (*Lepus cuniculus*). *Hunterian.*

1965. The skull of a Rabbit (*Lepus cuniculus*). *Presented by Henry Cline, Esq.*

1966. The skull of a Rabbit (*Lepus cuniculus*).

In this specimen the incisor teeth have acquired an unusual extent from non-apposition with those below, the result of an accidental injury to the left incisor of the lower jaw. The two auxiliary, or second incisors of the upper jaw are also greatly elongated, in consequence of the inferior incisors not coming in contact with them.

Presented by William Pretty, Esq., 1822.

1967. The skull of a wild Rabbit, with singularly elongated incisors, in consequence of their non-apposition. *Presented by Roger Wilbraham, Esq.*

1968. The skull of a Rabbit, with the incisors in a similar state. *Hunterian.*

1969. The skull of a Rabbit, with the incisors in a similar state.
Presented by Dr. Leach, F.L.S.

1970. The skull of a Rabbit, with the incisors in a similar state.
Presented by Hampton Weekes, Esq.

1971. The skull of a Rabbit, with the incisors in a similar state.
Presented by Robert Keate, Esq.

Family *Caviidæ.*

Genus *Dolichotis.*

Dental formula:—$i\,\frac{1-1}{1-1},\ p\,\frac{1-1}{1-1},\ m\,\frac{3-3}{3-3}=20.$

1972. The skull of the Patagonian Cavy, sometimes called Patagonian Hare (*Dolichotis patachonica*).

The roots of the teeth are exposed on the left side of the upper jaw and on the right side of the lower jaw. The inferior incisors extend back as far as the third molar (*m* 2); both these and the upper incisors are slightly impressed longitudinally along their convex side. The molars are curved; the upper ones with the concavity turned outwards, the lower ones with the concavity turned inwards, and in the last molar tooth also backwards. The par-

occipitals are longer and the acoustic bullæ are larger in proportion than in the Hare. The squamosal has a similar form and relation to the tympanic mastoid to those in the Hare. The inner termination of the auditory meatus forms a well-marked trumpet-mouthed expansion within the tympanic bulla. The articular surface for the lower jaw has the form of a wide groove scooped out longitudinally beneath the base of the zygomatic process. A depressed plate is continued from the inner side of the glenoid cavity and from the contiguous under and fore part of the squamosal forwards to the back part of the alveolar portion of the upper jaw, circumscribing a space into which the 'foramen lacerum anterius' opens, and analogous to the interpterygoid canals of the Agouti. The basisphenoid, alisphenoids, and pterygoids are wanting in this skull. The superorbital ridge has a small median notch, but not the wide and deep posterior ones which are seen in the Hare. The chief difference which the skull of the *Dolichotis* presents, as compared with that of the *Leporidæ*, is seen in the enormous size of the antorbital vacuity. The outer surface of the maxillary shows a large shallow excavation in which project the bosses formed by the implanted extremities of the curved molares. The nasal bones are long and broad. The nasal processes of the premaxillaries extend as far back as the nasals. The ramus of the lower jaw has a thick ridge extending along the outside of the alveoli, towards the condyle: the molar angle is compressed, much produced backwards, and rounded at its extremity; it is directly continued from the under and hinder borders of the jaw.

Presented by Sir Everard Home, Bart., V.P.R.S.

Genus *Hydrochœrus.*

Dental formula:—$i\ \frac{1-1}{1-1}$, $p\ \frac{1-1}{1-1}$, $m\ \frac{3-3}{3-3}=20$.

1973. The skeleton of a young Capybara (*Hydrochœrus Capybara*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 2 sacral, and 8 caudal: but the caudal series is incomplete in the present skeleton, and the first anchyloses with the two normal sacrals in the adult. The transverse processes of the last cervical are perforated, like those of the other six, by the vertebral arteries. Seven pairs of ribs articulate directly with the sternum, which consists of six bones. Short metapophyses are developed from the five anterior lumbars. There is no trace of clavicle. The acromion is long and slender, and bifid at its extremity, with the longer division directed downwards or backwards. The humerus is widely perforated between the condyles, but not above the inner condyle. The scaphoides and lunare are connate in the carpus. The pollex is wanting in the fore feet, and both the hallux and the fifth toe are wanting on the hind feet.

Mus. South.

1974. The skull of a full-grown Capybara (*Hydrochœrus Capybara*).

Although the entire series of permanent teeth is in place, and this skull measures upwards of seven inches in length, the sutures between the elements of the occipital bone still remain. The compressed paroccipitals, developed as exogenous processes from the exoccipitals, are of

enormous length. The basioccipital contributes to each condyle its lower extremity. The exoccipitals very nearly meet above the foramen magnum, the plane of which is nearly vertical. The squamosals are distinct, and essentially like those in the Hare, sending backwards the long compressed lamina which clamps the tympanic and mastoid to the side of the cranium. A venous sinus issues from beneath this process of the squamosal. The longitudinal groove forming the articular cavity for the lower jaw at the base of the zygoma is more angular than in the *Dolichotis*, and is completed externally by the malar bone. The meatus auditorius is unusually contracted, is cleft below, and bounded there by two small tuberosities. The temporal and orbital fossæ are blended together. The lacrymal bone is of unusual size, and extends forwards upon the side of the face between the frontal and maxillary. The antorbital vacuity is immense. The nasal processes of the maxillary present a shallow depression. The nasal bones are long, large, and of nearly equal breadth throughout. The nasal processes of the premaxillaries are coextensive with them. The sagittal suture is obliterated, as well as a great part of the frontal suture. There is no trace of interparietal bone. There is a single foramen incisivum situated anterior to the two large normal prepalatine apertures; the postpalatine foramina are in the centre of the bony palate, between the palatines and maxillaries. The palatines are large. The lower jaw shows a strong ridge or platform outside the molar alveoli. The coronoid and condyloid processes rise very little above the grinding surface of the molars. The chief process of the lower jaw is the angle, which is broad, compressed, and produced far backwards, where it terminates obtusely. The upper surface of the skull is flat, and its contour deviates little from a straight line, slightly descending towards the occiput and towards the ends of the nasals. The zygomatic arch is compressed but deep, especially below the fore part of the orbit. The acoustic bullæ are comparatively small. The incisors are longitudinally grooved along their convex sides.

Purchased.

1975. The skull of a smaller Capybara (*Hydrochœrus Capybara*), with the mature dentition.

The teeth have been removed from the right side of the upper and lower jaws and are separately displayed. The scalpriform incisors show the characteristic curvature and equable size from the exposed to the implanted extremity, the latter of which is deeply excavated by a large conical cavity, which contained the persistent pulp. The enamel is partially disposed along the outer or convex half of the tooth, and so maintains a sharp edge on the exposed and abraded extremity. These are characteristics of the incisors common to the entire Order. The longitudinal groove which indents the enamelled surface of both upper and lower incisors is peculiar to a certain number of the Rodentia with the Capybara: the molar teeth show in a well-marked degree the transverse direction of the enamel plates, which renders their action most efficacious in the grinding movements of the lower jaw backwards and forwards, to which directions the peculiar form of the glenoid articular surfaces almost restricts it. The molar teeth are four in number on each side of both jaws; the first displacing a deciduous molar is thus shown to be a premolar: it resembles in structure the two succeeding molars in the upper jaw, and consists of two plates of dentine, each of which is bent lengthwise upon

itself towards the outer surface. The coat of enamel thus presents a deep angular fold penetrating from the outer side of each plate or lobe of dentine. These lobes are united together by a thick layer of cement, which substance also fills the enamel folds. The last molar is much larger than the rest, and consists of a greater number of enamelled dentinal plates; of these, the first only resembles the folded dentinal lobes of the antecedent molars; the rest are simple, broad lamellæ, placed not quite transversely, the outer border being more backwards than the inner one; there are eleven of these plates in addition to the first folded plate, and the outer border of the last plate is reflected inwards, forming the rudiment of an additional plate. The sides of the large and deep socket of the last molar are grooved for the reception of the transverse plates, which are cemented together by thick layers of cement; in the lower jaw the three anterior grinders are larger, and the fourth is smaller than those above: the premolar consists of three grooved or inflected plates of dentine with the enamelled fold penetrating their inner surface; the next tooth consists of three similar lobes, but the fold penetrates the outer surface of the third lobe. The third and fourth grinders each consist of four lobes of dentine, the first and fourth lobes being grooved, the second and third being simple plates; the groove enters the inner side of the first and the outer side of the fourth lobe. Bristles are passed through the bony canals which open into the back part of the prepalatine foramina.

Hunterian.

1976. The skull of a Capybara (*Hydrochœrus Capybara*), vertically and longitudinally bisected.

It is nine inches in length. The elements of the occipital have coalesced, and the basioccipital has coalesced with the basisphenoid. The pterygoids are excavated by large conical sinuses, with an obtuse apex directed upwards and forwards; the sinus being formed anteriorly by the proper pterygoids, and posteriorly by the ecto- and ento-pterygoid plates of the sphenoid. The ectopterygoid plate is perforated by a canal, answering to the interpterygoid canal of the Agouti, above which is a smaller ectocarotid canal. The process from the squamosal, which articulates with the maxillary tuberosity, also articulates with the pterygoid and ectopterygoid process external to the canals above described.

Presented by Prof. Owen, F.R.S.

The following are parts of the same skeleton of the Capybara.

Presented by the Zoological Society of London.

1977. The skull, with the calvarium removed, and the teeth of the left side shown in their sockets.

The basisphenoid is perforated by a median vertical canal, and is notched laterally by the entocarotids. The cribriform plate and its median ridge or 'crista galli' project backwards into the large rhinencephalic fossa. There is no interparietal.

1978. The lower jaw, with the teeth on the left side similarly displayed.

1979. The atlas and axis.

1980. The four succeeding cervical vertebræ.

1981. The dorsal vertebræ, with the last cervical and first and second lumbar vertebræ. The transverse processes of the last cervical are perforated: they do not abut against the diapophyses of the first dorsal.

The Capybara gives one of the best illustrations of the distinction of the metapophyses (*Apophyses antobliques* of Straus-Durckheim) from the true anterior oblique processes. The metapophysis may be distinguished as a tubercle above the diapophysis from the third to the eighth dorsal vertebræ inclusive: at the eighth and ninth it begins to project forwards; in the tenth it is longer than the diapophysis that supports it; in the eleventh the metapophysis begins to shift its position, and rises half-way between the diapophysis and the prozygapophysis; in the twelfth dorsal it rises behind the prozygapophysis; in the fourteenth it has got above that process, and the articular surface begins to ascend upon the inner side of its base: the change of place and aspect of that surface is completed in the lumbar series. The anapophysis separates itself from the metapophysis in the eleventh dorsal, and progressively increases to the penultimate dorsal, beyond which it decreases, and it disappears on the fifth lumbar. The diapophysis is suppressed in the last four dorsal vertebræ. This is again developed suddenly, and of a quadrate flattened form, upon the first lumbar vertebra, where it coexists with both anapophysis and metapophysis, the latter being reduced in size. The last dorsal receives the whole of the articular surface for the head of its rib.

1982. The last four lumbar vertebræ.

1983. The sacrum.

1984. The eight caudal vertebræ.

The neural canal is completely exposed in the fifth.

1985. The right scapula.

1986. The right humerus.

The intercondyloid space is perforated, but not the inner condyle.

1987. The left humerus, in longitudinal section.

1988. The right ulna.

1989. The right radius.

1990. The left ulna, in longitudinal section.

1991. The left radius, in longitudinal section.

1992. The ossa innominata.

1993. The right femur.

1994. The left femur, in longitudinal section.

1995. The right tibia.

1996. The left tibia, in longitudinal section.

1997. Two fibulæ.

1998. The right calcaneum.

1999. The right astragalus.

2000. The right patella.

Genus *Cavia*.

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{3-3}{3-3}=20$.

2001. The skeleton of the Guinea Pig (*Cavia aperea*, domesticated variety; *Cavia cobaia*, Schreber; *Mus porcellus*, Linn.).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, 5 caudal. The transverse processes of the last cervical are perforated. Eight pairs of ribs articulate directly with the sternum, which consists of five bones. The ridge representing the combined anapophyses and metapophyses rises distinct from the diapophysis of the ninth dorsal, bifurcates at the eleventh, the two processes becoming distinct on the thirteenth, and so continuing to the penultimate lumbar, the anapophysis disappearing on the last lumbar vertebra. The supraspinal fossa is narrower than the infraspinal one: the long acromion expands into an inequilateral triangular plate, the anterior notch not being deep enough to produce the bifurcate structure. The humerus is perforate between the condyles, but not at the inner condyle. The pollex is absent from the fore foot, and both first and fifth toes are wanting on the hind foot. The distal third of the fibula is closely applied to the corresponding part of the tibia. A fabella is preserved above each condyle of the right femur; one of them has been lost on the left leg.

Purchased.

2002. The skeleton of a Guinea Pig (*Cavia aperea*).

In both specimens the rudiment of a third trochanter projects from the middle of the outer side of the shaft of the femur.

Mus. South.

2003. The skeleton of the Guinea Pig (*Cavia aperea*).

In this skeleton the vertebral formula is :—7 cervical, 13 dorsal, 6 lumbar, 3 sacral, and 6 caudal. The intercondyloid space of the humerus is perforated, but not the inner condyle.

Purchased.

2004. The skull of the Guinea Pig.

The occipital foramen is relatively larger than in the Capybara, and of a subquadrate form: two small notches at its upper part indicate the superoccipital to form a larger portion of its circumference. The paroccipitals are well developed, but relatively shorter than in the Capybara. The acoustic bullæ are much more expanded. The squamosal presents a similar form, and is equally distinct from the petrotympanic. The sagittal suture is obliterated: the frontal one is retained. The nasal processes of the premaxillaries slightly expand at their posterior extremities, which reach as far back as the nasals themselves. The antorbital vacuity is considerable, and a depression above the anterior molar prominence conducts to the nasal cavity. The lacrymal expands posteriorly into a partial capsule of the sac, and extends anteriorly nearly across the bar, overarching the antorbital vacuity. The lower jaw, in its external ridge and long posteriorly produced angle, repeats the characters of that of the Capybara, but the coronoid and condyloid rise somewhat higher.

Hunterian.

2005. The skull of a Guinea Pig (*Cavia aperea*).

The auditory bullæ are perforated externally beneath the meatus, this perforation answering to the lower division of the hourglass-shaped auditory aperture in the Capybara.

Presented by Henry Cline, Esq.

2006. The skull of a Guinea Pig (*Cavia aperea*).

The molar teeth are removed from the left side of the upper, and from the right side of the lower jaw, and separately displayed. The bony palate is more deeply excavated behind than in the Capybara, and by a curved instead of an angular emargination. The ectopterygoids are more developed. The true molar series of the upper jaw meet anteriorly at an acute angle. The four teeth are similar in size and structure; each is divided into two lobes by a fold of enamel, extending from the inner side almost across the tooth; the outer coat of enamel bends round the end of this fold, and slightly indents the outer side of the hinder lobe or division of the tooth. The last molar is characterized by a slight production backwards of the outer angle of this lobe. The lower molar teeth resemble the upper ones reversed; that is, with the inner side turned outwards: both are curved and rootless, or with persistent matrices; the convexity of the upper teeth being turned inwards, those of the lower teeth outwards, and the alveolar ridges corresponding in their relative breadth with the depth of the folds which they penetrate. The incisors are not grooved along their enameled surfaces.

Hunterian.

2007. The skull of a Guinea Pig (*Cavia aperea*), vertically and longitudinally bisected.

The alisphenoid is perforated by an enormous foramen ovale, a thin tract of bone circumscribing it behind and separating it from the petrosal bulla.

Purchased.

Genus *Chinchilla*.

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{3-3}{3-3}=20$.

2008. The skeleton of the Chinchilla (*Chinchilla lanigera*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 3 sacral, and 23 caudal, which is probably one short of the true number. The common ridge of the anapophysis and metapophysis rises above the diapophysis of the ninth dorsal, bifurcates on the tenth, and separates into the two accessory processes on the eleventh vertebra: they are continued distinct to the penultimate lumbar. Seven pairs of ribs directly join the sternum, which consists of six bones. The clavicles are here complete: the acromion is long, slender and bifurcate, the lower and longer branch descending and curving forwards. The humerus is perforated between the condyles, but not above the inner condyle. The radius and ulna are in contact throughout the greater part of their length, but are not anchylosed. The scaphoides and lunare are connate. The pollex is retained with both phalanges, but does not reach to the end of the metacarpal of the index. The hallux is wanting in the hind foot, but there is a long entocuneiform bone and accessory ossicle on the inner side of the joint, between the astragalus and scaphoides. The fibula is very long and slender, but is articulated to the tibia only at its extremities. There is a fabella behind each condyle of the femur. The auditory bulla is enormous; it is formed by the expansion of the mastoids, tympanics and petrosals, the mastoids being pushed to the upper surface of the cranium, where they articulate with the parietals, interparietals and superoccipital, and are crossed at the lower border by the clamping processes of the squamosals, which pass backwards between the mastoid and tympanic, and bend down abruptly behind the auditory meatus, and between it and the posterior expanded part of the petrosal. There is a large oblong vacuity between the squamosal and tympanic, where the cerebral cavity is closed only by membrane. The area of the auditory meatus is a narrow oval, being, as it were, pressed in laterally: the direction of the canal is upwards and a little backwards. The sagittal suture, as well as the frontal one, remains. The malar bone extends more forwards, and forms a larger proportion of the zygoma than in the Guinea Pig. The antorbital vacuity is equally extensive, but it is deeper than it is wide. The fossa and communication with the nasal cavity above the molar protuberance is narrower than in the Guinea Pig. The nasal processes of the premaxillaries extend beyond the nasals. The outer side of the lower jaw is convex and regularly swollen by the protuberance answering to the bases of the curved molares, but has not the distinct ridge which characterizes the lower jaw in the Cavies. The angle is considerably produced backwards, but is much more

slender than in the Guinea Pig. The auditory bulla is pierced at the base of the external meatus: it has been laid open on the left side, showing the cells extending into the elevated mastoid. The lacrymal bone is very small and imperforate.

Purchased.

Genus *Lagostomus.*

2009. The right humerus of the Viscachia (*Lagostomus trichodactylus*).

It is not perforated either between the condyles or above the inner condyle. It is thick in proportion to its length, and is characterized by a well-defined deltoid process projecting above the middle of the shaft.

Presented by Hugh Cuming, Esq., F.L.S.

2010. The left humerus of the same Viscachia, in longitudinal section.

Presented by Hugh Cuming, Esq., F.L.S.

2011. The middle and terminal phalanges of one of the toes of the Viscachia, with the claw; which is strong, sharp-pointed, almost straight, and grooved at its under part. *Presented by Hugh Cuming, Esq., F.L.S.*

Genus *Ctenomys.*

Dental formula:—$i\,\frac{1-1}{1-1},\ p\,\frac{1-1}{1-1},\ m\,\frac{3-3}{3-3}=20.$

2012. A mutilated skull of the Magellanic Ctenomys (*Ctenomys Magellanicus*).

It is remarkable for the enormous expanse of the auditory bullæ, which extend from the part of the mastoid inclosed between the parietal, superoccipital and squamosal, downwards and forwards to the pterygoids. The exoccipital sends outwards a long narrow process, which arches over the bulla to articulate with the squamosal and tympanic, and the paroccipital stretches outwards and expands into a broad thin plate of bone, which supports the lower and posterior prominence of the bulla. The vacuity in the side of the cranial walls is left between the base of the clamping process of the squamosal and the tympanic. There is a small transversely oblong interparietal. The sagittal and frontal sutures are retained, and the temporal ridges are divided by a broad, smooth, almost flattened tract of the frontal and parietal. The premaxillaries are united by short and deeply-indented sutures with the frontals, the teeth of which extend beyond the nasals. The malar bone is three-sided, with a strong external ridge. A well-marked antorbital process accompanies the upper and anterior root of the zygoma. The antorbital vacuity is of considerable size. The molars are four in number on each side of both jaws, rootless, strongly curved: the last, *m* 3, is very small.

Presented by Captain King, R.N.

2013. The maxillary and premaxillary bones, with the teeth (excepting the last molars), of the *Ctenomys Magellanicus.*

The rhinencephalic part of the cranium is preserved.

Presented by Captain King, R.N.

2014. The left ramus of the lower jaw of the *Ctenomys Magellanicus,* with the implanted parts of the teeth exposed. *Presented by Captain King, R.N.*

2015. The facial part of the skull of the *Ctenomys Braziliensis.*

The interorbital part of the frontals is flat, with the superorbital ridges slightly raised above its level. The nasal bones are longer in proportion to their breadth, and straighter than in the Magellanic species. A portion of the narrow lacrymal is preserved with the antorbital process of the frontal and the attached process of the maxillary.

Presented by Charles Darwin, Esq., F.R.S.

Genus *Lagotis.*

2016. The cranium of Cuvier's Chinchilla (*Lagotis Cuvieri*), wanting the basisphenoid.

The mastoid portion of the large tympanic bulla rises to the upper surface of the cranium as in the true Chinchilla, but it is completely girt by a process of the superoccipital, which extends outwards to articulate with the extremity of the slender process of the squamosal. The vacuity which intervenes between the alisphenoid, parietal, and tympanic, and which, in other Mammalia, is closed by the more expanded squamosal, is here, through the retention by that bone of its primitive form as a diverging slender ray, left uncovered. The meatus is long, wide, infundibuliform, with the outlet obliquely truncate and directed upwards and a little backwards: the petrosal bulla, continued from its lower extremity, seems to describe a semicircular curve downwards and backwards, circumscribing the large foramen, which directly pierces the bulla beneath the meatus. The paroccipital is slender; its point does not extend below the level of the tympanic bulla. The articular groove for the lower jaw is deep, and is completed externally by the malar. An almost circular piece seems to be cut out of the zygoma, above the junction of the malar with the squamosal. The facial part of the lacrymal extends half-way across the antorbital root of the zygoma, where the zygomatic part of the maxillary articulates by suture with the nasal process of the same bone, circumscribing a large antorbital vacuity. The nasal processes of the premaxillaries slightly expand at their extremities, which extend beyond the corresponding ends of the nasals. A strong and long oblique ridge traverses the inner side of the ramus of the lower jaw. The outer side is irregularly swollen by the bases of the sockets of the curved molars, but has not the distinct ridge which characterizes that part in the Cavies.

Presented by J. B. Pentland, Esq.

The following are parts of the same skeleton of the *Lagotis Cuvieri*,

Presented by J. B. Pentland, Esq.

2017. The atlas.

The transverse process is pierced both horizontally and obliquely, and the vertebral artery also perforates the neural arch.

2018. The axis.

The under part of its body presents a flattened triangular discoid hypapophysis.

2019. The fourth cervical vertebra.

It shows the transversely oval form of the capacious neural canal.

2020. The seventh cervical vertebra.

It shows the simple imperforate transverse processes.

2021. A middle dorsal vertebra.

It shows the articular surfaces for the ribs upon the centrum and diapophysis: also, the distinct anterior and posterior zygapophyses, and the common base of the equally distinct anapophyses and metapophyses.

2022. The succeeding dorsal vertebra.

In this the anapophyses and metapophyses have as distinct an origin as the zygapophyses and the diapophyses.

2023. Two lumbar vertebræ.

In both these all the processes above mentioned are more developed, and the metapophyses have ascended upon the anterior zygapophyses. The diapophyses are elongated by coalesced antroverted pleurapophyses. The centrum is carinate beneath, and the fore part of the carina is produced into a small tubercle. The anapophysis is long and slender, and is applied to the outside of the metapophysis of the next vertebra.

2024. The last lumbar vertebra.

It is characterized by the suppression of the anapophyses.

2025. The sacrum and anterior caudal vertebræ.

Only two vertebræ are here anchylosed. Each is characterized by a very long compressed spine: the metapophyses are retained at the sides of the interspace between the spines.

2026. Nine middle caudal vertebræ.

They show the continuance of the metapophyses after the true zygapophyses and their articular surfaces have disappeared. The neural canal becomes a mere linear tube upon the eighth, ninth and tenth caudals, and disappears upon the eleventh.

2027. The left scapula.

The long and slender acromion has been broken off.

2028. The left humerus.

It is perforated between the condyles.

2029. The left radius.

2030. The left ulna.

2031. The left os innominatum.

The ilium is long, slender, three-sided, with a strong tuberosity above the acetabulum.

2032. The left femur.

The medullary arterial canal enters just below the small trochanter, and inclines downwards.

2033. The left tibia.

2034. The left fibula.

It is remarkably slender.

2035. The left patella.

2036. The left astragalus.

2037. The left os calcis.

2038. The tarsal and metatarsal bones of the right hind-foot, naturally articulated.

The inner or first toe is suppressed. The entocuneiform is elongated, and applied to the inner side of the base of the second metatarsal. There is a supplemental ossicle on the inner side of the joint, between the astragalus and scaphoides.

Presented by J. B. Pentland, Esq.

Family *Myopotamidæ*.

Genus *Myopotamus*.

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{3-3}{3-3}=20$.

2039. The skeleton of the Coypu (*Myopotamus Coypus*).

The vertebral formula is :—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 21 caudal. The transverse processes of the last cervical, being represented only by the diapophyses, are imperforate; those of the first dorsal are shorter, but much thicker, and are excavated at the extremity for the reception of the strong tubercle of the very short first thoracic rib. The spine of the second dorsal is remarkable for its sudden and extreme elevation; that of the last dorsal being almost rudimental, like those of the last five cervicals: the spine of the dentata is produced backwards above the posterior cervical vertebræ. The spine of the twelfth dorsal is that to which those of the other trunk-vertebræ converge. The diapophysis of the sixth dorsal vertebra supports a tubercle which in the succeeding vertebræ expands, and then divides at the twelfth dorsal into the anapophysis and metapophysis. The former subsides in the last lumbar, but the latter is continued along the sacral and a great part of the caudal region, continuing after the true zygapophyses have disappeared. Eight pair of ribs articulate directly with the sternum, which consists of six bones. The clavicles are complete. The acromion is of unusual length and slenderness, exceeding the extent of its base, or spine of the scapula; it is expanded and sub-bifid at its extremity. The border of the supraspinal fossa rises into an obtuse angle, but the infraspinal fossa surpasses it in breadth. The humerus is pierced between the condyles, but not above the inner condyle: the deltoid process is long and well defined. The femur has no third trochanter. A fabella is preserved behind each external condyle. The bones of the right leg of this skeleton have been fractured and united. The bones of the hind foot are long and well developed; and the breadth of this member, which is webbed, together with the long and strong tail, give the species great power of swimming. The scalpriform incisors are proportionally of unusual size. The temporal fossæ meet at a low ridge upon the parietal. The paroccipitals are relatively as strongly developed as in the Capybara; and the true mastoids also extend downwards in the form of three-sided, pointed processes, nearly half the length of the paroccipitals. In the general character of the lower jaw, the Coypu resembles the Capybara. The antorbital vacuities are very large, but the lacrymals are extremely reduced in size, and are grooved by the lacrymal duct.

Presented by Sir Everard Home, Bart., V.P.R.S.

2040. The lower jaw of the Coypu (*Myopotamus Coypus*).

It shows the deciduous molar and the first and second true molars; the third molar is just appearing. The outer walls of the sockets have been removed in the left ramus, showing the division of the base of the milk molar and first true molar into fangs. The germ of the

premolar has not yet begun to be calcified. The right ramus has been transversely bisected.

Presented by Prof. Owen, F.R.S.

Family *Dasyproctidæ* (Pacas and Agoutis).

Genus *Cœlogenys*.

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{3-3}{3-3}=20$.

2041. The skeleton of the Paca (*Cœlogenys Paca*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 9 caudal. The transverse processes of the last cervical are imperforate. Seven pairs of ribs articulate directly with the sternum, which consists of six bones. The anapophyses and metapophyses begin to be developed on the seventh dorsal, in which their potential base extends above the diapophysis as a continuous broad ridge; in the eighth dorsal the ridge is bilobed; in the ninth the lobes diverge; in the tenth and eleventh they become distinct processes: the diapophyses maintain their individuality in all these vertebræ. The anapophysis disappears on the last lumbar, but the metapophysis is retained, as in all the other lumbars. The pleurapophyses or rudimental ribs are retained at the ends of the long antroverted diapophyses of the last two lumbar vertebræ. The supraspinal fossa is deeper than the infraspinal one. The acromion is of great length, and bifurcated, but the lower branch is not developed as in the Hares. The humerus is perforated between the condyles, but not above the inner condyle. Both fore and hind feet are pentadactyle; the pollex is short and with two phalanges; but the hallux, in this skeleton, has three phalanges like the other toes, and is nearly equal in length to the second toe. There are two supplementary ossicles on the inner side of the tarsus, one articulated to the astragalus and scaphoides, the other to the entocuneiform and first metatarsal. There is a third larger supplementary ossicle beneath the tarsus; the ectocuneiform is articulated to the cuboid, not to the scaphoid. The size of the cranium and the degree of rugosity upon its upper surface, and especially upon the outer surface of the enormously expanded zygomata, indicate this specimen to have belonged to a male.

Hunterian.

2042. The skull of a Paca (*Cœlogenys Paca*).

The teeth are removed from the left side of both upper and lower jaws, and are separately displayed. From its smaller and more slender dimensions and minor development of the zygomatic arches and of the external rugosities, this skull has probably belonged to a female. It is adult with the mature dentition, and the sutures between the elements of the occipital are obliterated, as is likewise the sagittal suture. There is no trace of interparietal bone. The petrotympanic is free from the squamosal, and rather loosely suspended beneath the overarching posterior lamella of the squamosal, which bends down external to the mastoid and paroccipital. The malar is a slightly curved plate, twice as deep as it is long, and forms

the posterior third part of the zygomatic expansion, the rest being formed by the maxillary, which is unusually and enormously developed. The squamosal forms only the base of the zygoma; it is grooved below for the mandibular joint, to which the malar contributes the outer part. The nasal processes of the premaxillary do not extend so far back as the nasals: the large antorbital vacuity is reduced by the maxillary zygomatic plate to a crescentic form.

Hunterian.

2043. The skull of the Paca (*Cœlogenys Paca*), vertically bisected.

The zygomatic expansion of the maxillary is deeply excavated on the inner side; it forms, in the recent animal, a large bony capsule on each side of the mouth, communicating with the mouth and lined by the buccal membrane. The basioccipital, basisphenoid, and presphenoid have coalesced to form a continuous bony floor for the cranial cavity. A vertical sinus terminating below in two small foramina, communicating with the orbit, divides the rhinencephalic from the prosencephalic fossa. Bristles are passed through the foramina and also through the branch of the lateral sinus which leads from above the petrosal to between the squamosal and tympanic externally. The olfactory cavity extends backwards beneath the rhinencephalic one, but not above it. The wide aperture of the zygomatic bony cavity is well shown in this section. The third division of the fifth notches the alisphenoid posteriorly, the foramen ovale being an irregular fissure between the ali- and basi-sphenoid and the petrosal. The ectopterygoid process joins the proper pterygoid, and, with the entopterygoid plate, completes a wide interpterygoid canal. The base of the ectopterygoid is perforated by a wide ectocarotid foramen.

Presented by Charles Stokes, Esq., F.R.S.

2044. The skull of a Paca (*Cœlogenys Paca*), in three transverse sections.

The premolars are still concealed in the substance of the jaw, being the last of the molar series to be developed. In the posterior section may be seen the exclusion of the squamosal from the cranial cavity by a fissure which widens as it descends between the squamosal and petrotympanic. At the back part of the middle section the rest of the venous sinus occupying this fissure is shown. In the cavity of the acoustic bulla are seen the horizontal septum dividing the upper from the lower compartment of the anterior half of the bulla, and the termination of the meatus in the lower compartment. The cochlear cavities are exposed. In the fore-part of the middle section the vertical extent of the singular zygomatic chambers are well displayed, and the commencement of the antorbital canals formed by what are sometimes called the upper and lower branches of the anterior root of the zygoma. The right premolar is exposed in its concealed alveolus. The anterior section shows the descending processes of the nasals, and the anterior turbinals.

Presented by W. J. Broderip, Esq., F.R.S.

2045. The left ramus of the lower jaw of the same specimen, with the inner wall of the socket of the concealed premolar removed.

Presented by W. J. Broderip, Esq., F.R.S.

Genus *Dasyprocta.*

Dental formula :—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{3-3}{3-3}=20$.

2046. The skeleton of the Acouchy (*Dasyprocta Acuchy*).

The vertebral formula is :— 7 cervical, 13 dorsal, 7 lumbar,—the last having the characters of a sacral vertebra on the left side,—4 succeeding vertebræ are anchylosed to form the sacrum, and there are 14 free caudal vertebræ. The spine of the twelfth dorsal is that towards which those of the other trunk-vertebræ converge. The metapophysial ridge begins to be developed above the diapophysis of the ninth dorsal, and is divided into the anapophysis and metapophysis in the eleventh dorsal. The anapophysis is small upon the succeeding vertebræ, and disappears in the last lumbar. The metapophysis is better developed, and continues throughout the lumbar vertebræ. Eight pairs of ribs directly articulate with the sternum, which consists of nine bones, a distinct episternal being articulated to the anterior end of the manubrium. The axis vertebra is carinate, with a tubercle beneath. The transverse processes of the last cervical are perforated and bifid. There are no clavicles in this skeleton, but in two recent specimens dissected at the Zoological Society, slender clavicular bones, eight lines in length, were detected. The supraspinal and infraspinal fossæ are of equal depth. The acromion is long, slender, and expands into a triangular plate at its extremity. The humerus is perforated between the condyles, but not above the inner condyle. The radius and ulna have become anchylosed together, and the interosseous space is reduced to a narrow chink near their proximal ends. The fore foot is pentadactyle; the hind foot tridactyle. The femur gives a feeble indication of a rudiment of the third trochanter at the middle of its outer side. The long entocuneiform bone has coalesced with the inner side of the metacarpal of the second toe,—here the innermost. The supplementary ossicle crossing the articulation between the astragalus and scaphoides is present. Both scaphoid and cuboid bones send strong processes to the plantar side of the tarsus.

Hunterian.

2047. The skull of an Agouti (*Dasyprocta Aguti*).

The clamping posterior prolongation of the squamosal begins here to increase in breadth, and only a narrow fissure is left between its lower border and the tympanic, communicating with the cranial cavity. The sagittal suture is obliterated: the frontal one is retained. The temporal fossa, though small, begins to be more distinctly defined from the orbit by a postorbital process, formed by the postfrontal and squamosal. The zygoma is short and slender; its curvature being chiefly downwards. The antorbital vacuity is wide, and circumscribed externally by the zygomatic process of the maxillary, which is united by a suture to the nasal process of the same bone. The lacrymal is largely developed, perforated at its inner part, and forming a broad triangular plate in front of the orbit. The premaxillaries are large and subquadrate: their nasal angles are not produced so far back as the nasals themselves are. The meatal aperture of the auditory bulla is deeply notched at its lower border. A small, distinct, crescentic grooved ossicle for the support of the tympanic membrane is preserved and artificially attached to the right meatus auditorius. The posterior half of the lower

border of the mandibular ramus forms an outwardly projecting ridge extending from beneath the first molar to the backwardly produced angle of the jaw.

Hunterian.

2048. The skull of a young Agouti (*Dasyprocta Aguti*).

The superoccipital, not having coalesced with the other elements of the 'occipital bone,' is lost. The teeth have been removed from the right side of both upper and lower jaws and are separately displayed. The molar series is $\frac{3-3}{3-3}$, the first being the deciduous molar; its successor the premolar and the last true molar are concealed in their formative alveoli: the upper deciduous molar has three diverging fangs, the lower one has two; the base of the first and second true molars has just begun to divide into fangs.

Hunterian.

2049. The skull of an older Agouti, with the mature dentition.

The sutures between the superoccipital and exoccipitals are not quite obliterated. The teeth have been removed from the left side of both jaws and separately displayed.

Hunterian.

2050. The skull of an Agouti, longitudinally bisected.

The petrosal is deeply impressed by the lateral appendage of the cerebellum: the ridges defining the rhinencephalic and epencephalic chambers are well marked.

Presented by Capt. King, R.N.

2051. The cranium of an Agouti, in three transverse sections.

The posterior section shows the epencephalic and acoustic chambers; into the latter the cochlea projects, its base being applied over the lower division of the internal auditory passage: the cochlear canal describes three gyrations, in which the lamina spiralis is exposed: the short and wide 'meatus auditorius externus' terminates in an expanded hoop for the membrana tympani with a sharp well-defined border. One of the semicircular canals forms the tumid border circumscribing the fossa for the cerebellar appendage. At the back part of the middle section is shown the horizontal septum dividing the upper from the lower tympanic cell: the venous sinus is exposed in the fissure between the tympanic and squamosal. At the fore part of the middle section the rhinencephalic chamber is seen, bounded below and laterally by the commencement of the olfactory chamber: the anterior termination of the rhinencephalic chamber is seen in the anterior section.

Presented by Prof. Owen, F.R.S.

The following are parts of the same skeleton of an Agouti (*Dasyprocta Aguti*) :—

Hunterian.

2052. The cranium.

The calvarium is removed. The sella turcica is shallow, and not defined by clinoid processes; the chiasmal platform is subquadrate, and leads to a fossa, perforated by the two

large and approximated elliptical optic foramina; a deep and narrow groove extends from the optic fossa to the rhinencephalic compartment, where it divides to terminate at the orbito-ethmoidal foramina. The foramen rotundum and foramen lacerum anterius combine to form a large subquadrate vacuity. The cerebellar fossa on the upper part of the petrosal is very deep. The meatus internus is extremely shallow, and almost immediately divides into the cochlear and vestibular canals.

2053. The left ramus of the lower jaw.

2054. The atlas.

The transverse process is perforated horizontally and vertically, and the neural arch is also perforated on each side on both its anterior and posterior borders.

2055. The axis.

2056. The middle cervical vertebra.

2057. An anterior dorsal vertebra.

2058. Four succeeding dorsal vertebræ.

They show the progressive development of the metapophysis.

2059. Four posterior dorsal vertebræ.

They show the progressive development of the anapophysis.

2060. A lumbar vertebra.

It shows the distinctness of both these accessory processes from the zygapophyses and the diapophyses.

2061. The sacrum.

It consists of four anchylosed vertebræ: the first is remarkable for the elevation of its spine.

2062. The caudal vertebræ.

They are 11 in number. The neurapophyses are not united together in the seventh, but terminate above in tuberosities which bound the sides of an open neural canal. The tail is strongly bent upwards from this vertebra. Hypapophyses are developed beneath the fourth caudal, and distinct hæmapophyses are articulated to the interspaces of the succeeding vertebræ as far as the penultimate one.

2063. The left scapula.

The lower division of the acromion is more produced and curved than in the Acouchy.

2064. The left humerus.

It shows the large intercondyloid perforation, and the sharply defined borders of the trochlear joint.

2065. The left radius and ulna.

They are in close contact, but are not anchylosed.

2066. The bones of the right fore-foot.

The first row of carpals is formed by the scapholunar, the cuneiform, and a large pisiform. There is a supernumerary ossicle in the second row, between the os magnum and trapezoides, which answers to the smaller division of the scaphoid in the Orang and Turtle. The pollex is shorter than in the Acouchy: only its metacarpal is here preserved. The fifth finger is much reduced in size, but has the normal number of phalanges. The ungual phalanges are notched at their apex.

2067. The bones of the left fore-foot.

2068. The two ossa innominata.

2069. The left femur.

A fabella is attached to each condyle. The third trochanter is better marked than in the Acouchy. The orifice of the medullary canal is beneath the small trochanter.

2070. The right femur.

2071. The right tibia and fibula.

2072. The bones of the right hind-foot.

The entocuneiform has coalesced with the proximal end of the second metatarsal,—here the innermost. There is an accessory ossicle beneath the joint of the astragalus with the scaphoid. The scaphoid sends a long and strong process to strengthen the plantar side of the tarsus, but this is not a distinct ossicle. There is a distinct sesamoid beneath the joint of the cuboid with the fourth metatarsal,—here the outermost. It might be viewed as a rudiment of the fifth metatarsus,—here otherwise absent. There are strong trochlear sesamoids beneath the joints of the metatarsals with the proximal phalanges: the ungual phalanges are notched.

2073. The bones of the left hind-foot.

2074. The separated bones of the skull of an Agouti (*Dasyprocta Aguti*).

The bones are numbered on coloured labels, to correspond with the TABLE OF SYNONYMS.

The basisphenoid, presphenoid, and their respective alæ have coalesced into a single bone; but the pterygoid remains united by suture to the ectopterygoid and entopterygoid processes of the alisphenoid; and, by its union with the ectopterygoid process, an interpterygoid canal is formed, which is completed, as will be seen in the Porcupines, by the entopterygoid plate. Bristles are passed through the minute entocarotid canals, which perforate the sides of the basisphenoid near its back part. The alisphenoid is directly perforated by the foramen ovale, but there is neither an ectocarotid nor an alisphenoidal canal.

Presented by Prof. Owen, F.R.S.

Family *Hystricidæ* (Porcupines).

Genus *Hystrix*.

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{3-3}{3-3}=20$.

2075. The skeleton of the Crested Porcupine (*Hystrix cristata*).

It is of a female, and not quite adult, some of the epiphyses being still ununited. The vertebral formula is:—7 cervical, 15 dorsal, 4 lumbar, 4 sacral, and 12 caudal. Eight pairs of ribs directly join the sternum, which consists of seven bones. The potential base of the accessory processes begins to be developed upon the fourth dorsal, and divides upon the eleventh into the anapophysis and metapophysis. The distinction of both these processes from the diapophysis, which supports the last floating rib, is well marked in the last dorsal vertebra. In the lumbar vertebræ the anapophyses strengthen the joints by underlapping the metapophyses, but both processes become rudimentary in the last lumbar. The two anterior sacral vertebræ support the ilia. The hinder half of the upper costa of the scapula is straight and nearly parallel with the lower costa: the base is slightly curved, and at almost right angles with the costæ. The supraspinal fossa is broader than the infraspinal one, the spine inclining downwards or backwards and the acromion being bent in the same direction. The part answering to the descending process in the Cavies appears here to form a direct prolongation of the acromion, its true anterior extremity forming only an obtuse angle. The humerus has a large vacuity between the condyles, but no perforation above the inner condyle. The clavicular bones have not been preserved in this specimen.

Mus. South.

2076. The skull of a male Porcupine (*Hystrix cristata*).

The occipital region is nearly flat, and inclines from below upwards and a little forwards. The paroccipitals descend nearly to the level of the lower part of the occipital condyles. The mastoid forms only a rough ridge. The auditory bullæ are moderately developed: the external meatus is short, directed outwards and a little forwards, and is notched behind. A

fissure, which widens at both ends, divides the tympanic from the clamping process of the squamosal: this articulates behind by a suture with the mastoid. The parietals are broad, but short, and pinched in, as it were, by the temporal fossæ, which almost meet at the line of the sagittal suture, which is obliterated. The frontals are more than double the size of the parietals, and are greatly swollen by the enormous sinuses. The most remarkable feature of the Porcupine's cranium is the magnitude of the nasal bones, especially their great posterior expanse, which terminates behind on the same vertical parallel as the middle of the zygomatic arch. The thick anterior pier by which this inverted arch is suspended is formed by the maxillary and lacrymal. The slender horizontal process of the maxillary, which bounds the lower part of the antorbital vacuity, appears like a second zygoma. The premaxillaries progressively contract as they pass backwards and join the frontals, nearly an inch in advance of the hinder border of the nasals. The bony palate terminates by a thick rounded border between the last molar teeth (*m* 3). The pterygoids send backwards and upwards a hamular process, which joins the auditory bulla: the sides of the basioccipital present a rough tract, or process, which also articulates with the bulla. The last true molars (*m* 3) have recently come into place in both jaws. The first of the series is the deciduous molar, worn down to its diverging fangs, the grinding surface presenting a few small islands of enamel. In the lower jaw a strong ridge extends from the outer side of the molar alveoli to the angle of the jaw, which is not much produced.

Hunterian.

The following are parts of the same skeleton:—

2077. The atlas.

The transverse process is perforated horizontally and vertically by the vertebral artery, which afterwards pierces the neural arch: this is deeply grooved behind. There is a hypapophysial tubercle.

2078. The dentata.

Its body is carinate below. Its spine is large, compressed, and much produced backwards.

2079. The four succeeding cervical vertebræ.

The pleurapophysial parts of the transverse processes are developed forwards and backwards, and overlap each other.

2080. The last cervical vertebra.

The pleurapophysis is simple; but being anchylosed, as in the other cervicals, with the centrum and diapophysis, forms a "perforated thin transverse process."

2081. The dorsal vertebræ.

They are 15 in number, as in the skeleton, No. 2075. The natural cartilages are retained,

and those of the last four pairs of ribs appear to have terminated freely. The clavicles are retained in connection with the cartilaginous anterior extremity of the sternum.

2082. The four lumbar vertebræ.

They show the adaptation of the anapophyses to strengthen the joints of the articular processes.

2083. The sacrum and ossa innominata.

2084. The twelve caudal vertebræ.

Hæmal arches are articulated below to the eight anterior interspaces. The spinous processes of the five anterior vertebræ have expanded extremities flattened above, to aid in supporting and moving the caudal fasciculus of quills.

2085. The bones of the right anterior extremity, naturally articulated.

A greater proportion of the scapula is included between the parallel borders of the upper and lower costa and the concave border between the anterior end of the straight part of the upper costa, and the coracoid is shorter and deeper, than in the skeleton, No. 2075. The acromion is shorter and more expanded, especially at its extremity, which is bifurcate, the upper division being most produced. There is no perforation between the condyles of the humerus.

2086. The bones of the right hinder extremity, naturally articulated.

The perforation of the medullary artery of the femur is just below the small trochanter. There is a fabella behind the inner condyle, but none behind the outer one. The patella is large and long, ossification extending below the articular surface. The proximal end of the tibia is compressed, broad, with a slight projection from its front and back margin.

2087. The cranium of a Porcupine (*Hystrix cristata*), vertically and longitudinally bisected, with the teeth removed from the right side, and separately displayed; the three true molar teeth and the long incisor from the same side of the lower jaw being displayed on the same tablet.

This cranium agrees with that of the preceding disarticulated skeleton in general size, in the sharp sagittal ridge formed by the meeting of the temporal crests, which extend from the coronal suture, in the comparative shortness of the frontal bones, whereby the frontal suture does not exceed in length the sagittal one, in the smaller proportional extent of the facial part of the lacrymal, in the greater proportional length of the nasals as compared with the

frontals, and in the more concave lateral border of the nasal which joins the premaxillary, producing a corresponding difference in the adapted border in that bone, as compared with the same part in the Cape Porcupine. The cerebellar depression upon the petrosal is very shallow: the fore part of the petrosal presents a large protuberance. The rhinencephalic fossa is relatively of large size, and is defined by a well-marked ridge from the rest of the cranial cavity. Two vascular canals are continued into its lower part from above the optic foramina, instead of an open groove, as in the Aguti. The compressed and coalesced pre-frontals are shown in the left moiety of the cranium. The vomer is deeply cleft posteriorly, and has coalesced with the ethmoturbinals. The anterior median part of the vomer articulates with the median ascending process of the premaxillary arching over the wide vacuities which lead from the nasal passages to the prepalatine apertures. In the upper jaw the last molar, *m* 3, has been recently attained, but the deciduous molar is not shed. The alveolus of reserve for its successor is exposed in the middle of the base of the socket between the three diverging fangs, and is of small size; the development of the matrix of the premolar having only just commenced. The different bones are numbered on coloured labels corresponding with the Table of Synonyms. The section displays the nasal and frontal sinuses, and a slight extension of the latter into the fore part of the parietal. The portion of white quill is passed through the ectocarotid canal, which pierces a small part of the alisphenoid, entering at its posterior margin. The alisphenoid canal, through which a portion of black quill is passed, commences also at the posterior border of the alisphenoid, just above the preceding, and diverges from the ectocarotid, traversing a larger proportion of the alisphenoid. The ectopterygoid plate of the alisphenoid unites by suture with the pterygoid, and circumscribes a large irregular vacuity called the 'interpterygoid canal.'

Hunterian.

2088. The skull of a Porcupine (*Hystrix cristata*).

It presents the same cranial characters as Nos. 2076 and 2087. It is from an animal which had been kept in confinement, and the capsules of the matrices of the last molars and premolars have been the seat of inflammation with tumefaction from the development of a thick irregular crust of cement around the dentinal and enamel portions of the teeth. The fissure between the tympanic and squamosal is wider throughout than in the Cape Porcupine.

Presented by William Clift, Esq., F.R.S.

2089. The left ramus of the lower jaw of an old European Porcupine (*Hystrix cristata*), with the premolar in place and the crown worn. *Hunterian.*

2090. The skull of a female Cape Porcupine (*Hystrix cristata*).

Like that of the male, No. 2076, it differs from the skull of No. 2087 in the temporal ridges not quite meeting above the sagittal suture, and commencing anteriorly two or three lines behind the frontal suture. It also differs in the greater antero-posterior extent of the frontals, the frontal suture being one-third longer than the sagittal suture; it differs in the less

backward extension of the nasal bones, whose expanded posterior extremities are terminated by a minor or more open curve. The lateral border of the nasals which joins the premaxillary, and the nasal processes of the premaxillary, are longer and narrower: the facial part of the lacrymal is more extensive: the anterior root of the zygoma is much broader, and the antero-inferior root more slender. A fracture of the outer table of the cranium shows the extension of the sinuses into the parietal bones. The premolars have recently come into place in both jaws.

Purchased.

2091. A mutilated skull of a male Cape Porcupine (*Hystrix cristata*).

This specimen repeats all those characters by which No. 2090 differs from the skulls of the European and N. African Porcupines. The last true molars have come into place, but their summits have hardly begun to be worn. The matrix of the premolar is shown by the formative cavity to have acquired almost the full size of the crown, but calcification had not commenced. The teeth are removed from the left side of both upper and lower jaws, and are separately displayed. The socket of the nascent premolar is shown on the right side of both the upper and the lower jaws. The cavity of the cranium is exposed, showing the deep sella and the posterior clinoid processes: there is not the protuberance at the fore part of the petrosal which is shown in the *Hystrix cristata*, No. 2087. The base of the posterior process of the squamosal divides the alisphenoid from the parietal, both on the inner and outer sides of the skull. The frontal descends in front of this to join the alisphenoid, as well as the orbitosphenoid and prefrontals.

Purchased.

2092. The skull of the Asiatic Porcupine (*Hystrix hirsutirostris*).

The premolars have come into place in both jaws, but their summits have scarcely begun to be worn. This skull equals in size that of the Cape Porcupine, but differs both from it and from the European *Hystrix cristata* in the almost uniform breadth of the long and large premaxillaries, whose broad truncated posterior extremities terminate parallel with those of the nasal bones. These bones are parallelograms. The frontal bones exceed the parietals in length. The temporal ridges commence anterior to the fronto-squamosal and sagittal sutures, and meet to form a sharp crest above the interparietal bone, which encroaches between the posterior halves of the parietals. The fissure between the squamosal and tympanic is widest in the middle, instead of at its two ends; the facial part of the lacrymal is relatively smaller than in the Cape Porcupine. The bony palate is more deeply and angularly notched behind. The hinder border of the lower jaw is deeper and less excavated than in the Cape or European Porcupines. The enamelled part of the incisors is stained of a deep orange. The dentition, being at the same stage as in the skull of the female Cape Porcupine, No. 2090, well illustrates the modification of the grinding surface of the teeth characteristic of the two species.

Hunterian.

2093. The cranium of the Asiatic Porcupine (*Hystrix hirsutirostris*), in three transverse sections.

The posterior section shows the termination of the cranial air-cells continued from the nasal and tympanic cavities. The tympanum is divided by a horizontal partition into an upper and lower chamber, intercommunicating posteriorly above the membrana tympani, which is situated in the lower division, the meatus auditorius externus terminating in a narrow oblique slit at the upper part of that division. The continuation of the lateral sinus with the squamosal sinus is well shown in this section. The middle section shows posteriorly the two tympanic chambers, and although it is taken anteriorly through the middle of the frontals, it includes the whole of the rhinencephalic chamber. The extraordinary extent of the air-sinuses surrounding the fore part of the cranial cavity and developed in the orbitosphenoids, the alisphenoids, the squamosals, and frontals, with the radiating bony septa of those sinuses and the commencement of the attached turbinals, are shown at the fore part of this section. The permanent teeth are separately displayed, with the exception of those of the left ramus of the lower jaw, which are exposed 'in situ,' showing the relations of the long socket of the scalpriform incisor to the sockets of the molar teeth: the summits of the premolars are unworn.

Presented by N. Wallich, M.D., F.R.S.

The following are parts of the same skeleton:—

2094. The atlas.

The transverse process is perforated both horizontally and vertically by the vertebral artery, which afterwards pierces the neural arch. This is deeply grooved behind, the groove being almost converted into a foramen by the approximation of the posterior zygapophyses or condyles. These are convex, repeating the characters of the condyles of the occiput. A rough ridge extends transversely across the arch, rising into a tuberosity at its middle, and dividing the outer surface of the arch into two facets.

2095. The axis.

2096. The five posterior cervical vertebræ.

The last of these has its transverse process perforated. The detached articular epiphysis shows that this part completes not only the end of the centrum, but an equal extent of the bases of the neurapophyses.

2097. The fifteen dorsal vertebræ.

A deep excavation divides the metapophysis from the diapophysis of the anterior vertebræ.

2098. The ribs of the right side.

2099. The ribs of the left side.

2100. The manubrium and four other bones of the sternum.

2101. The four lumbar vertebræ.

The anapophyses are suppressed on the last vertebra.

2102. The four sacral vertebræ.

The transverse process of that of the first and half of that of the second vertebra are rough for the attachment of the ilia.

2103. Eleven of the caudal vertebræ.

The neural canal is unclosed above on the eighth. The spines of the four anterior vertebræ are long, and thickened at their summits: the transverse processes of all the vertebræ are long, broad and flattened: they are perforated and deeply notched in the ninth and tenth. One of the detached hæmal arches is preserved.

2104. The right scapula.

2105. The right humerus.

There is a wide vacuity between the condyles.

2106. The right ulna.

2107. The right radius.

2108. The right femur of the same Porcupine.

The medullary artery enters below, and to the inner side of, the small trochanter.

2109. The right tibia.

2110. The right fibula.

2111. The skull of the Java Porcupine (*Hystrix Javanica*; *Acanthion Javanicum*, F. Cuvier).

It is more slender in proportion to its length than in the European or African Porcupines. The upper wall of the cranium is less swollen by the development of air-cells. The hinder extremities of both the internal and external pterygoid plates articulate with the rough prominences from the auditory bullæ. The temporal ridges, commencing from the frontal suture, are feebly marked, and do not unite upon the interparietal to develope a sagittal crest. The anterior boundary of the interparietal continues to be defined, and shows it to be coextensive with the hinder half of the parietals between which it is wedged. Both frontal and sagittal sutures are retained. The frontal suture is as long as the parietal one. The nasal bones form long and narrow parallelograms, very slightly expanded posteriorly, where they

extend further back than the premaxillaries. The premaxillaries contract towards that extremity, which is obliquely truncate, and strongly contrast with the expanded extremities of the same bones in the Asiatic Porcupine. The antero-inferior root of the zygoma is stronger in proportion. The facial part of the lacrymal is as small as in the Asiatic species. The hinder border of the lower jaw is slightly concave. The last molars, *m* 3, are in place, and worn; the premolars have risen into place in the lower jaw, but their summits are unworn: the deciduous molars are still retained in the upper jaw. The cavity of reserve of the germ of the upper premolar is exposed on the right side. The basisphenoid and presphenoid have coalesced with each other and with their respective alæ. The alisphenoid canal, in which a portion of quill is passed on the right side, commences at the middle of the inner surface of the alisphenoid, and perforates it obliquely forwards. The ectocarotid canal, through which a bristle is passed, commences at the posterior border of the alisphenoid, and emerges near the anterior border of its ectopterygoid plate: this, as in other Porcupines, articulates suturally with the pterygoid proper, forming with that and with the broad entopterygoid plate a large oblong interpterygoid canal. A bristle is passed through the small entocarotid canal on the right side.

Presented by Sir Stamford Raffles, P.Z.S.

2112. The cranium of a young Java Porcupine (*Hystrix Javanica*).

Some of the bones, *e. g.* the basioccipital and exoccipitals, have been detached. The suture between the superoccipital and the large interparietal is obliterated on the outside, but not on the inside of the skull. The inferior and external angle of the superoccipital fits into a notch of the mastoid, and articulates anteriorly with the end of the squamosal: the mastoid, petrosal, and tympanic have coalesced into a single bone. There is a deep, but narrow, cerebellar fossa in the petrosal above the 'meatus internus,' and a convex swelling at its fore part, formed by a tympanic air-cell, which communicates by a contracted aperture with that chamber of the tympanum which lodges the membrana tympani. The squamosal overlaps the lower border of the parietal, from which it is partially separated by the sinus opening above the tympanum. The molars in use are $\frac{2-2}{2-2}$, the first being the deciduous molar, the second the first true molar. The summit of the second true molar may be discerned in its almost closed alveolus.

Presented by Sir Stamford Raffles, P.Z.S.

2113. The skeleton of a young crestless Porcupine (*Hystrix alophus*).

The vertebral formula is:—7 cervical, 14 dorsal, 5 lumbar, 3 sacral, and 15 caudal. The accessory tubercle begins to be developed above the diapophysis of the fourth dorsal, expands upon the eighth, and divides upon the ninth: this and the three following vertebræ show very clearly the distinction between the anapophysis and metapophysis, and of both from the more constant processes of the vertebræ. To the left diapophysis of the first lumbar vertebra a short pleurapophysis is anchylosed. Seven pairs of ribs directly articulate with the sternum, which consists of six bones. A few of the hæmal arches in the tail are preserved; their spines are long, compressed, and expanded. The transverse processes of most of the

caudal vertebræ are well developed with thick and rough extremities. The spine of the scapula and the long and bifid acromion are bent downwards. The slender clavicular bones are preserved: they are joined by long ligaments to the 'manubrium sterni.' There is a wide vacuity between the condyles of the humerus. The cranium of this species differs from that of the Asiatic and Java Porcupines in the greater expanse and rounder termination of the posterior ends of the nasals, and the corresponding ends of the premaxillaries are more pointed than in the Java species. The facial part of the lacrymal is very small. The posterior border of the lower jaw is straight, as in the Asiatic Porcupine.

Purchased.

Genus *Erithizon.*

2114. The skull of the young Canada Porcupine (*Erithizon dorsatum*).

The last molar is in place, and the deciduous molar is retained: the germ of the premolar is exposed in its formative alveolus in both jaws. The greater part of the sagittal suture, as well as of those between the parietal, interparietal, and superoccipital bones, have been obliterated, and the elements of the occipital have coalesced. The squamosal remains distinct from the petrotympano-mastoid, which has been removed from the left side. The upper surface of the frontals forms almost a flat square platform, bounded laterally by a well-defined superorbital ridge. The antorbital vacuities are very large: their lower boundary extends almost directly outwards. A short and narrow bony palate is perforated at its middle by two foramina. The prepalatine foramina open into a large common fossa.

Hunterian.

The following are parts of the same skeleton:—

2115. The atlas.

The short, but broad, transverse process is perforated both horizontally and vertically by the vertebral artery, which afterwards perforates the neural arch.

2116. The axis and third cervical vertebra.

These have coalesced at the summits of their neural arches, although the centrums remain distinct; and the epiphyses still intervene, both between the third and second vertebræ and also between the body of the axis and the odontoid process.

2117. The four succeeding cervical vertebræ.

The seventh is distinguished by the non-expansion of the pleurapophysial part of its perforated transverse process.

2118. The six anterior dorsal vertebræ.

In most of these the line of union between the centrum and the neural arch may be seen,

and especially in that in which the two epiphyses are kept in connection with the centrum. The epiphysial plates rise above the centrum and are applied to the fore and back parts of the base of the neurapophysis.

2119. Four of the posterior dorsal vertebræ.

They show the diapophyses, metapophyses, and anapophyses, distinct from each other.

2120. Three of the lumbar vertebræ.

The metapophyses and anapophyses are here more strongly developed.

2121. Three sacral vertebræ.

The two anterior of these have their transverse processes expanded to join the ilia.

2122. The three anterior caudal vertebræ.

They show the short and thick spines and strong transverse processes.

2123. The right scapula.

2124. The clavicles.

2125. The shaft of the right humerus.

The intercondyloid portion is thick and imperforate.

2126. The shaft of the right ulna.

2127. The shaft of the right radius.

2128. The right ilium.

2129. The right ischium and pubis.

They have coalesced at their hinder extremities.

2130. The shaft of the left femur.

It shows the rudiment of a third trochanter.

2131. The shaft of the tibia.

2132. The shaft of the fibula.

2133. The right astragalus.

2134. The right calcaneum.

2135. The skull of a mature Canada Porcupine (*Hystrix dorsata*), with the premolars in use and in place. Most of the cranial sutures are obliterated.

Presented by Sir John Richardson, M.D., F.R.S.

Genus *Atherura.*

2136. The skull of the Indian Brush-tailed Porcupine (*Atherura fasciculata*).

The last true molar is not in place; the milk-molar is not shed. The interparietal has coalesced with the superoccipital, and extends forwards to penetrate the frontal suture, completely separating the parietal bones from each other, as in most fishes. The parietal bones have coalesced with the anterior part of the squamosals, the posterior or clamping processes remaining distinct: the tympano-petromastoid is loosely suspended beneath them. The nasal bones are parallelograms, not extending further back than the base of the antero-inferior root of the zygoma. The premaxillaries send backwards their contracted but obliquely truncated extremities to the same extent. The antero-inferior is still separated from the antero-superior process of the maxillary by a suture: they circumscribe very wide antorbital vacuities. The bony palate terminates by a thick rounded concave border behind the second true molar tooth (*m* 2), which is the third of the grinders here in use.

Presented by Sir Stamford Raffles, P.Z.S.

The following are parts of the same skeleton of the *Atherura fasciculata*:—

2137. The atlas.

This vertebra differs from that of the *Erithizon dorsatum* by the presence of a ridge extending transversely over the neural arch, so as to define an anterior and posterior surface on the upper part of that arch.

2138. The axis.

It has a long neural spine, but is distinct from the third vertebra.

2139. The five succeeding cervical vertebræ.

2140. Nine anterior dorsal vertebræ.

2141. Four posterior dorsal vertebræ.

2142. The five lumbar vertebræ.

2143. The three sacral vertebræ.

2144. Three of the caudal vertebræ.

2145. The right scapula.

2146. The right humerus.

2147. The right ulna.

2148. The right radius.

2149. The right os innominatum.

2150. The right femur.

2151. The right tibia.

2152. The right fibula.

2153. The left tibia, longitudinally bisected.

2154. The left fibula.

2155. The right astragalus.

2156. The right calcaneum.

Family *Castoridæ* (Beavers, Voles).

Genus *Castor*.

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{3-3}{3-3}=20$.

2157. The skeleton of a young Canada Beaver (*Castor canadensis*).

The vertebral formula is:—7 cervical, 19 dorso-lumbar, 4 sacral, and 25 caudal. The accessory process appears upon the seventh dorsal vertebra, and divides at the eleventh into anapophysis and metapophysis: the anapophysis disappears on the last lumbar. The last true molars (*m* 3) have recently been acquired, but the milk-molars are not shed: the germ of the premolar is exposed on the right side of the lower jaw. The elements of the occipital bone are still unanchylosed: the lower third of each condyle is formed by the basioccipital, the under surface of which presents a large and deep excavation. The upper part of the foramen magnum is completed by the broad superoccipital. The mastoid is larger than in the Porcupines, and articulates anteriorly with both the parietal and squamosal: it is anchylosed to the petrosal. There is a perforation in the suture between the superoccipital and mastoid. The interparietal is large, and wholly upon the upper surface of the cranium. The squamosal is perforated behind and below the root of the zygoma. The frontals are small and almost flat above. The nasal bones extend a little further back than the premaxillaries, but not beyond the transverse line which extends between the antorbital tuberosities. The anterior root of the zygoma formed by the maxillary is a simple plate which appears to be imperforate, the orifice of the slender antorbital canal being concealed by a vertical ridge of the maxillary, which inclines forwards over the maxillo-premaxillary suture.

Mus. Brookes.

2158. The skull of a Canada Beaver (*Castor canadensis*).

It is of a mature animal, with the permanent teeth fully acquired. The temporal ridges have met upon the parietal bones, and have developed a low crest along the interparietal, and a higher transverse occipital crest. The tympanic extends outwards and curves forwards and a little upwards: the perforation in the squamosal between the tympanic and zygomatic processes is retained and well marked. The perforations between the superoccipitals and mastoid are less distinct. Both paroccipital and mastoid processes are distinctly, but not excessively developed.

Presented by Henry Cline, Esq.

2159. The skull of a Canada Beaver (*Castor canadensis*).

The thin plate of the basioccipital, which forms the roof of the depression in that bone, appears to have been absorbed in some parts. The long hamular process of the pterygoids articulates with the rough process of the petrosal. A ridge is continued from the tubular tympanic upon the outer side of the petrosal bulla.

Presented by Sir John Richardson, M.D., F.R.S.

2160. The skull of a Canada Beaver (*Castor canadensis*). The nascent premolar has begun to appear on the left side of the upper and lower jaws.

Presented by Henry Cline, Esq.

2161. The cranium of a Canada Beaver (*Castor canadensis*). The nasal bones have been removed, and a line drawn between the antorbital tubercles, showing its relation to the hinder ends of the nasals. The foramen between the superoccipital and mastoid is large, while that between the orbitary and zygomatic processes of the squamosal is very small in this skull. *Hunterian.*

2162. The anterior part of the cranium of a young British Beaver (*Castor europæus*; *C. fiber*, Linn.). The nasal bones have been removed, and a line drawn between the antorbital tuberosities, showing the greater extent to which the nasal bones are extended beyond such line. This osteological character of the European species is constant, and serves to distinguish the skull from that of the Canada Beaver. *Presented by Prof. Owen, F.R.S.*

2163. A portion of the skull of a young Canada Beaver (*Castor canadensis*), with the teeth removed from the left side of the upper and lower jaw, and separately displayed.

The first of the molars is the deciduous one, and the germ of its successor may be dis-

cerned beneath the socket in both jaws. The deciduous molar is larger in the preceding specimen of the British Beaver, which also shows the germ of a premolar above the socket of the left upper deciduous molar.

Hunterian.

2164. A mutilated skull of the Canada Beaver (*Castor canadensis*), showing the permanent dentition *in situ.*

The premolar is larger than any of the true molars in the upper jaw, and its crown has a greater antero-posterior extent than that in the lower jaw.

Hunterian.

2165. The cranium of a Canada Beaver (*Castor canadensis*), in longitudinal section, with the implanted parts of the teeth exposed from the inner side in the right moiety.

The cerebellar depression of the petrosal is large and very deep. The anterior surface of the petrosal is concave. The sella turcica is extremely shallow, and without clinoid processes: the middle of the basioccipital is reduced by the excavation on its under surface to extreme thinness. The small vacuity in the basisphenoid is exposed, which communicates with the cranial cavity close to the 'fissura lacera anterior.' The presphenoid is perforated transversely. The rhinencephalic fossa is well marked. The anterior end of the vomer articulates with both the maxillary and premaxillary bones.

Hunterian.

2166. The cranium of a Canada Beaver (*Castor canadensis*), in three transverse sections.

The epencephalic compartment is lower and broader than in the Porcupine. The cerebellar fossa of the petrosal is much larger and deeper. The upper compartment of the tympanum is much less. The length and direction of the auditory meatus, and its change of form, into a transverse fissure, as it approaches the membrana tympani, the plane of which is almost parallel with that of the meatus itself, are well shown in this section, as also the thinning of the basioccipital produced by the depression on its under surface. The anterior section includes the whole of the rhinencephalic fossa, and shows the transverse perforation of the orbitosphenoids beneath the chiasmal platform. There are no nasal air-sinuses in the cranial bones of this aquatic Rodent, and their texture is denser than in most of the Order.

Presented by Prof. Owen, F.R.S.

2167. The lower jaw of a Canada Beaver (*Castor canadensis*), with the permanent dentition. *Hunterian.*

2168. The lower jaw of a Canada Beaver, with the permanent dentition.

These duplicate specimens serve to show the slight amount of variation in the characteristic pattern of the grinding surface to which the molar teeth are subject.

Hunterian.

2169. A portion of the branch of a tree which has been gnawed by a Beaver, indicating the force with which the great incisors act upon the woody tissue.

The following are parts of the same skeleton of a Canada Beaver (*Castor canadensis*).

Hunterian.

2170. The atlas.

It is perforated and notched, as in the Porcupine: a tuberosity is developed from the upper and fore part of the neural arch. There is no tubercle on the under part. The hinder articular processes are slightly concave.

2171. The axis.

It is short, but high, and the fore part of the base of the strong spine overhangs the odontoid proeess.

2172. The sixth cervical vertebra.

It is remarkable for its shortness and great breadth.

2173. The first dorsal vertebra.

It shows the expansion of the diapophysis, and the impression on its under part for the tubercle of the rib.

2174. The sixth dorsal vertebra.

It shows the aecessory process developed above the diapophysis.

2175. The ninth dorsal vertebra.

The aeeessory proeess has expanded: the diapophysis has diminished.

2176. The thirteenth dorsal vertebra.

The accessory process has here divided into the anapophysis and metapophysis.

2177. The fourteenth dorsal vertebra.

It shows the eomplete separation of the metapophysis from the diapophysis, and the advancement of the former to above the anterior zygapophysis.

2178. An anterior lumbar vertebra.

It shows the development of the diapophysis to an equality of length with the two aecessory proeesses.

2179. A posterior lumbar vertebra.

It shows the elongation of the transverse process by the anchylosed pleurapophysis, and the reduction of the metapophyses to rudimentary tubercles.

2180. The sacrum.

It consists of four anchylosed vertebræ: the articular surface for the ilium is almost confined to the transverse process of the first of these vertebræ: those of the last are the longest. The sacral nerves directly perforate the neurapophyses of the last two vertebræ, anterior to the vacuity left between the bases of the transverse processes. The neural arches of the first six caudal vertebræ are similarly perforated.

2181. An anterior caudal vertebra.

The long depressed transverse processes are slightly expanded at their extremities.

2182. The right scapula.

It is narrow in proportion to its length, and the acromion bends slightly forwards to meet the clavicle.

2183. The right clavicle.

2184. The right humerus.

The deltoid ridge is strongly marked by a tuberosity. Both the intercondyloid space and inner condyle are imperforate.

2185. The right ulna.

2186. The right radius.

2187. Two ungual phalanges.

2188. The right os innominatum.

2189. The right femur.

A third trochanter is developed from a ridge extending along the outer side of the bone.

2190. The right tibia and fibula.

The fibula is anchylosed to the tibia by its lower third.

2191. The patella.

2192. The astragalus.

2193. The right calcaneum.

Its posterior half is flattened vertically.

2194. Three toe-phalanges.

The following are parts of the same skeleton of a Beaver (*Castor canadensis*):—

2195. The last cervical and first dorsal vertebræ, with the left rib, showing the extent to which the head articulates with the last cervical, and the cavity in the much-expanded diapophysis of the dorsal which receives the tubercle of the rib, and which is strengthened anteriorly by the abutment of the perforated transverse process of the last cervical. The extremity of this process is an epiphysis: the articular ends of the centrums are also epiphyses.

2196. The fourth dorsal vertebra, with the left rib attached, showing the extent of the head which articulates to the vertebra in advance, and the attachment of the tubercle to the diapophysis. The deep excavations on the upper surface of the centrum leading to the vascular canals are well shown.

2197. The sixth dorsal vertebra, with the left rib attached, showing the development of the accessory tubercle above the diapophysis.

2198. The eighth to the twelfth dorsal vertebræ, inclusive, of the same Beaver; showing the development and separation of the accessory tubercle from the diapophysis, and its progressive transformation into the anapophysis and metapophysis. This is accompanied with a progressive diminution of the diapophysis, which ceases to articulate with the rib in the eleventh vertebra.

2199. The sacrum of a Canada Beaver (*Castor canadensis*), vertically bisected.

It shows the epiphyses of the centrums and the small cavities between them, indicating the remnant of the intervertebral substance in the otherwise anchylosed vertebræ: also the perforation directly through the neurapophysis, anterior to the smaller conjugational foramen.

Hunterian.

2200. The left humerus of a Beaver (*Castor canadensis*), vertically bisected, to show the absence of the medullary cavity, its place being occupied by a coarse cancellous tissue. *Presented by Prof. Owen, F.R.S.*

2201. The right femur of a Beaver (*Castor canadensis*), vertically bisected, to show the absence of the medullary cavity, its place being occupied by a coarse cancellous tissue. *Presented by Prof. Owen, F.R.S.*

2202. The left tibia with the anchylosed fibula of a Beaver (*Castor canadensis*), vertically bisected; showing the absence of a medullary cavity in the tibia, and the complete confluence of its compact wall with the anchylosed part of the fibula. *Presented by Prof. Owen, F.R.S.*

2203. The right ramus of the lower jaw of a Beaver, in which the incisor, by want of opposition from that in the upper jaw, has proceeded to grow until its point has again penetrated the mouth between the condyloid and coronoid processes, as far as the base of its own socket, having described a complete circle, but a little obliquely. The atrophied condition of the articular process and ascending ramus of the jaw indicates the impediment to its movements which this anomalous growth of the incisor has occasioned. *Hunterian.*

2204. The dried tail of a Beaver (*Castor canadensis*), showing the scaly integument. *Hunterian.*

Genus *Fiber.*

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{2-2}{2-2}=16$.

2205. The skull of the Ondatra or Musk Vole (*Fiber zibeticus*).

The basioccipital is not excavated, as in the Beaver, but there is the same perforation between the mastoid and superoccipital, and a large vacuity in the posterior process of the squamosal communicating directly with the cranial cavity. The squamosal is unusually expanded above the zygomatic process, and articulates largely with both frontal and parietal. The zygomatic process of the maxillary reaches almost to that of the squamosal, and supports a great part of the malar bone. The antorbital foramen is larger than in the Beaver, but is bounded externally, as in it, by a nearly vertical ridge of the maxillary. The interorbital septum is perforated behind, beneath the orbitosphenoid. There is no distinct lacrymal

bone; but the turbinal bones appear at the fore part of the orbit between the two processes of the maxillary which join the frontal, and above the aperture communicating with the nasal cavity. The anterior part of the maxillary, in front of the antorbital foramen, is swollen, and forms a curved canal commencing by an oblique aperture superiorly, and descending outwards and backwards round the socket of the superior incisor to terminate in the nasal meatus: this part may, probably, protect the lacrymal sac and duct. The interparietal is a transversely quadrate bone. The sagittal suture is retained, and the upper surface of the parietal is smooth, and nearly flat: the temporal ridges meet and develope a crest upon the narrow frontals, obliterating the frontal suture. The back part of each ramus of the lower jaw is trident-shaped from the almost equal development of the coronoid and angular processes, on each side the base of the narrow process supporting the condyle. The molar teeth are remarkable for their alternately disposed triangular lobes.

Presented by Henry Cline, Esq.

2206. The skull of an Ondatra (*Fiber zibeticus*), with the teeth removed from the right side of both upper and lower jaws, and separately displayed.

It is smaller than the preceding specimen, and is probably the skull of a female.

Hunterian.

2207. The upper and lower jaws of the Ondatra (*Fiber zibeticus*), with the teeth from the left side of the upper and from the right side of the lower jaw displayed.

Short roots have been developed from the grinding teeth. These consist of the premolar, *p* 4, and first and second true molars, *m* 1, *m* 2, on each side of both jaws. The premolar is the largest, especially in the lower jaw, where it presents six lobes on the inside and five on the outside of the crown.

Hunterian.

Genus *Arvicola*.

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{2-2}{2-2}=16$.

2208. The skull of the Water Vole (*Arvicola amphibia*).

The foramen magnum is triangular and pointed above. The paroccipitals are more developed than the mastoids. The occipito-mastoid foramina are small. The squamosal perforation is large. The interparietal is a transversely quadrate bone. The temporal ridges meet upon the compressed frontal, but do not develope a crest. There is no trace of lacrymal bone. The, probably lacrymal, canal on the fore part of the maxillary curves round the outside of the socket of the incisor, as in the Ondatra, but is less swollen. The zygomatic process of the maxillary does not extend so far backwards as in the Ondatra. The interorbital septum is entire. The turbinals are exposed anterior to the orbits. The angular and coronoid pro-

cesses of the lower jaw are subequally developed, are slender, and pointed. A postorbital ridge is developed from the fore part of the expanded plate of the squamosal, as in the Ondatra.

Presented by William Clift, Esq., F.R.S.

2209. The skull of the Water Vole (*Arvicola amphibia*).

Presented by Henry Cline, Esq.

2210. The upper jaw of the Water Vole (*Arvicola amphibia*), in which, from some accident to the lower jaw, the incisors have not been opposed, and have consequently grown to an unusual length, and are curved and pointed.

Presented by Sir Joseph Banks, P.R.S.

The following are parts of the same skeleton of the Water Vole (*Arvicola amphibia*).

Hunterian.

2211. A mutilated cranium.

The canal is laid open which leads from the crescentic orifice at the fore part of the antorbital aperture into the lower part of the nasal meatus, above the prepalatine fissures.

2212. The two rami of the lower jaw.

2213. The atlas.

The transverse process is perforated both horizontally and vertically by the vertebral artery, which afterwards perforates the neural arch. This is also perforated behind by the second pair of spinal nerves. The atlas consequently presents four distinct foramina on each side of the 'foramen magnum,' or neural canal.

2214. The remaining cervical vertebræ, with the bones of the trunk and tail.

The dentata and third cervical have each two tubercular hypapophyses. The first free or 'dorsal' rib is very securely articulated by its head to the interspace between the last cervical and first dorsal, by its tubercle to the ends of the diapophyses of the same two vertebræ, and by the under part of its neck to the pleurapophysis of the sixth cervical vertebra. The potential base of the accessory processes progressively expands above the diapophyses of the dorsal vertebræ as far as the tenth, and divides in the eleventh, the metapophysis and anapophysis being quite distinct on the twelfth. The anapophyses disappear in the last lumbar vertebræ. Thirteen pairs of ribs are here preserved, and the seven anterior pairs directly join the sternum, which consists of six bones, the last being unusually long and slender, and supporting a xiphoid cartilage. Five vertebræ are anchylosed to form the sacrum, and there are 21 caudal vertebræ. The iliac bones articulate exclusively with the first of the sacral series. The clavicles, with the two episternal ossicles, are preserved in connection with the manubrium sterni.

2215. The left scapula.

The acromion is long and bent downwards; its inferior process is feebly developed.

2216. The left humerus.

The deltoid process is prominent and well-defined, compressed, and bent downwards. There is a minute perforation between the condyles, but none above the inner one.

2217. The left radius and ulna, with the bones of the left fore-foot.

The bones of the fore-arm are in contact and closely united, except at the narrow space near their proximal ends. The pollex is represented by its metacarpal bone.

2218. The bones of the left hind-leg.

The femur has a third trochanter, with two patellæ in front, and two fabellæ behind the condyles. There is a small ossification at the anterior end of each semilunar cartilage. The fibula is anchylosed to the tibia at both its extremities. The entocuneiform is long, and applied to the inner side of the base of the second metatarsal, but it supports a short metatarsal with the first and ungual phalanx of its proper digit, the hallux.

2219. The right femur.

The distal epiphysis is still ununited: the two fabellæ remain attached.

2220. The right tibia and fibula with the small and great patellæ, and the two ossicula developed in the semilunar cartilages.

2221. The skeleton of the Short-tailed Field Vole (*Arvicola arvalis*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 17 caudal. The frontal bones are suddenly compressed between the orbits, but their upper surfaces are smooth and flat, the temporal ridges not meeting upon them. The humerus shows a well-marked deltoid process. The third trochanter is feebly indicated upon the femur. The pollex is rudimental on the fore foot. The hallux is fully developed, though short, on the hind foot.

Presented by Sir Joseph Banks, Bart., P.R.S.

2222. The skull of a larger specimen, probably a male, of the Field Vole (*Arvicola arvalis*). *Presented by William Clift, Esq., F.R.S.*

Family *Muridæ*.

Genus *Mus*.

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{2-2}{2-2}=16$: molars rooted..

2223. The skeleton of a large male Black Rat (*Mus Rattus*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 3 sacral, and 30 caudal. Seven pairs of ribs directly articulate with the sternum, which consists of six bones. The spine of the second dorsal is much elongated, and its apex is a detached epiphysis. The spine of the tenth is that towards which the spines of the other trunk-vertebræ converge. The accessory process, commencing in the sixth dorsal, divides into the metapophysis and anapophysis in the ninth dorsal: the anapophyses are obsolete in the last two lumbar vertebræ. The clavicles are slender, but are complete. The deltoid ridge is angular, and commences near the upper end of the humerus, which is imperforate at the lower extremity. A strong ridge represents the third trochanter of the femur. There is a fabella behind each condyle. The distal portion of the fibula coalesces with the tibia.

Mus. Brookes.

2224. The partially articulated bones of the skeleton of the female of the Black Rat (*Mus Rattus*).

The vertebral formula is:—7 cervical, 19 dorsal and lumbar, 5 sacral and 32 caudal.

Mus. South.

2225. The skeleton of the Norway Rat (*Mus decumanus*).

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, 3 sacral, and 22 caudal, but the end of the tail is incomplete in this skeleton. The spines of both the first and second dorsal vertebræ are here elongated, and a semiossified cartilaginous epiphysis is articulated to the summit of both. This species differs from the Black Rat chiefly in its relatively shorter tail.

Presented by Robert Willis, M.D., F.R.S.

2226. The skeleton of a female Norway Rat (*Mus decumanus*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 28 caudal.

In all these skeletons of the Rats, the tubercle of the first rib articulates with the diapophysis of the last cervical as well as with that of the first dorsal.

Presented by Henry Cline, Esq.

2227. The skull of a Norway Rat (*Mus decumanus*).

The upper surface of the cranium bends very slightly from the straight line in its extent from the superoccipital crest to the end of the nasal bones. There is a broad interparietal: the sides of the parietals bend down almost at a right angle with the nearly flat upper sur-

face, the two surfaces being defined by the temporal ridge, which extends horizontally forwards to bound in like manner the upper surface of the frontals. The temporal fossa is bounded behind by a vertical ridge, some way in advance of the sides of the superoccipital ridge. There is a crescentic vacuity between the squamosal and tympanic. The antorbital vacuity is defended externally by a subvertical plate upon the front part of the maxillary root of the zygoma, and there is a direct opening into the nasal chamber anterior to the orbit besides the vertical curved, probably lacrymal, canal, external to the alveolus of the upper incisor.

Presented by William Clift, Esq., F.R.S.

2228. The skull of a Norway Rat (*Mus decumanus*). The rami of the jaws are separated, and the teeth exposed *in situ*. *Presented by William Clift, Esq., F.R.S.*

2229. The skull of a Norway Rat (*Mus decumanus*). *Presented by Henry Cline, Esq.*

2230. The skull of a large Norway Rat (*Mus decumanus*), longitudinally bisected.

The petrosal has a deep cerebellar fossa: the cochlear and vestibular orifices commence distinctly upon its inner surface, and not from a common 'meatus internus.' A prominent acute-angled ridge divides the anterior from the posterior surface of the petrosal. The rhinencephalic chamber is of proportionally large size. There is no sella, or pituitary depression, nor clinoid processes. The bony canal, which commences at the fore part of the antorbital vacuity, and bends round the outside of the incisive alveolus, inclines forwards, and terminates below the attachment of the anterior turbinal to the premaxillary.

Presented by Prof. Owen, F.R.S.

2231. A transversely bisected skull of the Norway Rat (*Mus decumanus*).

Presented by Prof. Owen, F.R.S.

2232. The mutilated skull of a large male Norway Rat (*Mus decumanus*), with unusual elongation of the incisors, the consequence of want of mutual apposition. *Presented by Dr. Leach, F.L.S.*

2233. The skull of a female Norway Rat, showing a similar abnormal growth of the incisors from the same cause. *Presented by H. Carwardine, Esq.*

2234. The skull of a Norway Rat (*Mus decumanus*).

The teeth removed from the left side of both upper and lower jaws, and separately displayed. The grinders have diverging roots or fangs, as in other omnivorous Rodents. The large premolar in the upper jaw has not fewer than five fangs.

Hunterian.

2235. The teeth from the left side of the upper and lower jaws of the *Mus decumanus*, separately displayed. *Hunterian.*

2236. The skull of the Jullador Rat (*Mus indicus*).

The projection of the base of the socket of the lower incisor forms a prominent feature of the ascending ramus outside the root of the condyloid process.

Presented by Dr. Patrick Russell, F.R.S.

2237. A right inferior incisor of a large Rat, which from want of apposition has continued to grow until it has formed one complete circle and the segment of a second. *Presented by Sir Joseph Banks, Bart., P.R.S.,*

With the following translation of an extract from a letter in Spanish, which he received with the specimen :—

"I send it you that you may admire the extraordinary tooth of this little animal. Believe me, it is true, it was found in the Nazareth Garden (to which order I belong), near the Bar (entrance to the port), and when it was killed I took the tooth: I know not its virtues, nor have the natives ever discovered them."

2238. The skeleton of the common Mouse (*Mus musculus*).

The vertebral formula is :—7 cervical, 12 dorsal, 7 lumbar, 4 sacral, and 27 caudal.

Hunterian.

2239. The skeleton of the common Mouse (*Mus musculus*).

The vertebral formula is :—7 cervical, 12 dorsal, 6 lumbar, 4 sacral, and 27 caudal.

Presented by Henry Cline, Esq.

2240. The skeleton of the common Mouse (*Mus musculus*).

The vertebral formula is :—7 cervical, 12 dorsal, 6 lumbar, 3 sacral, and 29 caudal.

Presented by William Clift, Esq., F.R.S.

2241. The skeleton of the Australian Brown-footed Rat (*Mus fuscipes*).

The vertebral formula is :—7 cervical, 13 dorsal, 6 lumbar, 2 sacral, and 28 caudal. The second dorsal is distinguished, as in the rest of the genus, by the superior length of its spinous process: the eleventh dorsal spine is that towards which those of the other trunk-vertebræ converge. The tubercle of the first rib abuts against the diapophyses of the seventh cervical and first dorsal. The pleurapophysis of the sixth cervical underlaps its neck. Seven pairs of ribs directly join the sternum, which consists of six bones. The anapophysis becomes distinct on the eleventh dorsal, and disappears in the penultimate lumbar. The diapophyses

are rudimental in the anterior lumbar, and progressively increase to the last of that series of vertebræ. The clavicles are entire. The radius and ulna are firmly united to each other. There is a third trochanter in the femur. Nearly the distal half of the fibula has coalesced with the tibia. The pollex is shorter than the metacarpal of the index, but the hallux is longer than the metatarsal of the second toe.

Mus. Gould.

Genus *Hapalotis.*

Dental formula as in *Mus.*

2242. The skeleton of the White-footed Australian Rat (*Hapalotis albipes*).

The vertebral formula is:—7 cervical, 13 dorsal, 7 lumbar, 2 sacral, and 30 caudal. The tubercle of the first rib abuts against the diapophyses of the last cervical and first dorsal vertebræ. The pleurapophysis of the sixth cervical extends backwards to the neck of the rib. The second dorsal is characterized, as in other *Muridæ*, by the superior length of its spine. The space between the tenth and eleventh dorsal is that towards which the spines of the trunk-vertebræ converge. The accessory tubercle projects distinctly above the diapophysis of the eighth dorsal, and divides in the eleventh, the metapophysis overlapping the posterior zygapophysis of the tenth dorsal. The anapophyses continue distinct upon the four anterior lumbar vertebræ, the diapophyses of which are better developed than in the Common Rat. Seven pairs of ribs directly join the sternum, which consists of six bones. The clavicles are entire. The humerus is perforated between the condyles. The radius and ulna are moveably united. There is a third trochanter: the distal half of the fibula coalesces with the tibia, except at its extremity. The back part of the mastoid is perforated. The back part of the squamosal is notched, and there are two vacuities in the cranial walls above the tympanic. The temporal muscle has left a shallow indentation on the side of the squamosal. The superorbital ridge is well marked, and the frontal surface is slightly concave. There is a strong antorbital process, and the antero-inferior root of the zygoma sends forward a broad sharp plate along the outside of the antorbital vacuity. The canal external to the incisive alveolûs opens above in advance of this plate. There is a tubercle at the lower angle of the antorbital vacuity. The interparietal is a transverse subquadrate bone. The coronoid process is barely indicated. The dental formula accords with that of the genus *Mus*, to which all the leading characters of the skeleton prove the close affinity of the *Hapalotis*.

Mus. Gould.

Genus *Hydromys.*

Dental formula:—$i\,\frac{1-1}{1-1},\ p\,\frac{1-1}{1-1},\ m\,\frac{1-1}{1-1}=12.$

2243. The skeleton of the Australian Water Rat (*Hydromys chrysogaster*).

The vertebral formula is:—7 cervical, 14 dorsal, 7 lumbar, 2 sacral, and 30 caudal. The vertebral artery, after piercing the transverse process of the atlas longitudinally and vertically,

pierces the neural arch midway between its fore and hind borders. The pleurapophysis of the sixth cervical is strong, and directed outwards and backwards beneath the diapophysis of the seventh. This vertebra has no pleurapophysis, and its transverse process is, therefore, imperforate. The first rib of the dorsal vertebræ is unusually short. The second dorsal vertebra is remarkable, as in other *Muridæ*, for the height and strength of its spine, which has a rough obtuse termination, as if for the attachment of an epiphysis. The spine of the eleventh dorsal is that towards which those of the other trunk-vertebræ converge. The accessory process divides on the twelfth vertebra, and the metapophysis and anapophysis are distinct on the five following. The anapophysis is obliterated in the last four lumbar vertebræ. The transverse processes of the caudal vertebræ are remarkable for their antero-posterior extent, and give an oblong quadrate form to the vertebræ in the middle of the tail: in the posterior caudal vertebræ these processes become notched on either side. Most of the caudal vertebræ have strong hæmapophyses, and the whole forms the basis of a powerful natatory organ. Eight pairs of ribs directly join the sternum, which consists of seven bones. The clavicles are entire. The deltoid ridge projects from the fore part of the proximal half of the humerus, and is prominent below. The humerus is imperforate. The ulna sends a process to abut against the radius across the middle of the interosseous space. The fore-foot is pentadactyle, but the pollex does not exceed the length of the metacarpus of the index. The femur has a third trochanter and a fabella behind each condyle. The distal third of the fibula has coalesced with the tibia. The hallux extends to the second phalanx of the next toe. The strength of the hinder half of the skeleton, with the size of the hind extremities, contrasts with the slenderness of the fore part.

Hunterian.

2244. The skull of the *Hydromys chrysogaster.*

The teeth of the right side of the upper and lower jaws are separately displayed. The ribs are exposed *in situ.*

Hunterian.

2245. The skull of a female *Hydromys chrysogaster.*

The cranium is broad and depressed, smooth and slightly convex above: the interparietal is semicircular. A crescentic opening is left between the broad posterior part of the squamosal and tympanic. The auditory bulla is of moderate size. The outer border of the antorbital aperture is not produced forwards, as in the true Rats and the Arvicolidæ, and the aperture of the canal external to the incisive alveolus is larger and more conspicuous. The malar bone is unusually small, compressed, styliform, and suspended between the roots of the zygomatic arch. A distinct tubercle projects from the lower end of the antorbital hole.

Presented by the Natural History Society of Calcutta.

Family *Spalacidæ* (Mole-Rats).

Genus *Bathyergus.*

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{3-3}{3-3}=20$.

2246. The skeleton of the great Cape Mole-Rat (*Bathyergus maritimus*).

In this genus the development of the scalpriform incisors, and of those parts of the skull forming attachments for the muscles that work them, reaches its maximum. The vertebral formula is:—7 cervical, 13 dorsal, 7 lumbar, 4 sacral, and 12 caudal, but the end of the tail is imperfect. The sockets of the inferior incisors are prominent features of the lower jaw, and appear to form the lower border of its rami; the angles standing outwards and downwards as broad aliform appendages, with their base of attachment extending from the condyle forwards to beneath the second molar tooth. The atlas has a tubercle both above and below. The axis has a broad compressed spine: the rest of the cervical vertebræ are spineless: the transverse processes of the last (seventh) are imperforate. The accessory tubercle commences above the diapophysis of the fourth dorsal, and rapidly expands, in the six succeeding ones, into a long, broad, compressed plate, overhanging the tubercle of the rib. It divides into the metapophysis and anapophysis on the twelfth vertebra. The anapophyses disappear in the last two lumbar vertebræ. The diapophyses are rudimental in the four anterior lumbars, and are unusually short in the last two. Six ribs articulate directly with the sternum, which consists of five bones; the last supporting an ensiform cartilage. The upper border of the scapula describes an open angle; its outer surface is nearly equally bisected by the spine, which rises to an unusual height, and sends off a remarkably long subtrihedral acromion, the extremity of which appears as a thick epiphysis bent towards the long and strong clavicles with which it articulates: a well-marked deltoid process stands out from the middle of the shaft of the humerus, which is imperforate at its distal end. The olecranon is unusually thick and expanded. The femur shows a rudiment of a third trochanter. The fibula is anchylosed to the tibia. A remarkable accessory ossicle, articulated to the tarsal os naviculare, projects inwards like an accessory or sixth digit of the hind foot. As in other burrowing animals, the lumbar and pelvic regions are narrow. The occipital region of the skull is very broad and low. The compressed paroccipitals project downwards and backwards. The auditory bulla is pyriform, its apex articulating with the pterygoids. The temporal fossæ meet along a well-developed crista extending from the interorbital region to the strong transverse superoccipital crest. The squamosal forms a horizontal plate, with a curved border extending from the root of the zygoma to above the 'meatus externus,' which is directed upwards and forwards. The zygomatic arches are strongly curved outwards. The premaxillaries extend further backwards than the nasals: these are very long and narrow. The upper incisors are grooved anteriorly; the lower incisors are not grooved.

Mus. South.

2247. The skeleton of a female (*Bathyergus maritimus*).

The vertebral formula in this skeleton is:—7 cervical, 14 dorsal, 6 lumbar, 4 sacral, and 13 caudal, but one vertebra is probably wanting from the end of the tail.

Presented by Thomas Keate, Esq.

2248. A somewhat mutilated skeleton of apparently a small female of the *Bathyergus maritimus.*

Its vertebral formula is:—7 cervical, 14 dorsal, 7 lumbar, 4 sacral: but a part only of the caudal series of vertebræ remains. In this, as in the other specimens of *Bathyergus*, there is a vacuity in the lateral walls of the cranial cavity, between the squamosal and tympanic.

Mus. Langstaff.

2249. The skull of the *Bathyergus maritimus.*

Presented by Sir Everard Home, Bart., V.P.R.S.

2250. The anterior portion of the jaws of the *Bathyergus maritimus*, with the dried skin covering them, showing the contracted aperture of the mouth, and the mode in which the large inferior incisors perforate the skin and protrude below that aperture. *Mus. Brit.*

2251. The skeleton of the smaller Cape Mole-Rat (*Bathyergus Capensis*).

From the state of the bones of the extremities, as well as the dentition, it is an adult. It differs from the preceding species in the upper incisors not being grooved anteriorly, in the proportionally longer and narrow scapulæ, in the greater inclination forwards and the less lateral expanse of the occipital region, and in the greater posterior expanse of the nasal bones. The cranium shows the same vacuity between the squamosal and tympanic. The auditory meatus is directed more upwards than forwards.

Mus. Brookes.

Family *Helamidæ* (Jumping Hares).

Genus *Helamys.*

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{3-3}{3-3}=20$.

2252. The skeleton of the Cape Jumping Hare (*Helamys capensis*).

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, 3 sacral, and 29 caudal. The pleurapophysial part of the seventh cervical appears to have coalesced with that of the sixth. The diapophyses of the first dorsal are unusually long and strong: the anapophysis begins

to be developed from the back part of that of the eighth dorsal, and the metapophysis, from the front part of that of the ninth: this ascends upon the anterior zygapophysis of the twelfth dorsal. Both accessory processes are of considerable length in the lumbar region, except in the last two vertebræ. The lumbar spines progressively increase in length to the last, and are strongly inclined forwards towards that of the eleventh dorsal, which is vertical; the antecedent dorsal spines inclining backwards to the same vertebra, which is the centre of the movements of the trunk. The spines of the sacral vertebræ converge to the middle one, which is long and strong. The neural canal becomes exposed on the ninth vertebra of the tail. There are hæmal arches and hypapophyses beneath most of the caudal vertebræ. Seven anterior pairs of ribs articulate directly with the sternum, which consists of six bones. The lower costa of the scapula forms an acute angle with the base, and the infraspinal fossa is much broader than the supraspinal one, the spine of the scapula curving towards the upper angle. The acromion is moderately long and slender, the tuberosity answering to the lower division in the *Caviadæ*. The clavicles are strong, and curved backwards at their outer half. The humerus is perforated at the inner condyle, but not between the condyles. The bones of the fore-arm have a long and wide interosseous space, and allow of free pronation and supination. The hand is pentadactyle, and the whole anterior extremity much shorter than the posterior one. The iliac bones extend upwards considerably above their junction with the anterior sacral vertebræ, and curve outwards. The tuberosities of the ischia are unusually developed. The thyroid, or obturator vacuities are very extensive, the size of the pelvis according with that of the hinder extremities. The great trochanter is of unusual length, is expanded and slightly bent at its extremity. The fossa upon the neck of the femur is unusually deep; there is no third trochanter. The medullary artery enters on the inner side of the base of the small trochanter. The slender fibula coalesces with the lower third of the tibia, but both its extremities are free, and the lower one is detached, as in the Chevrotain, from the rest of the bone. The calcaneum, astragalus, and cuboid are all remarkable for their length: the scaphoid sends a long and thick process downwards and forwards to beneath the middle cuneiform and the base of the metatarsus of the second toe. There is an oblong ossicle attached to the inner side of the base of the same metatarsal; but whether it be the ento-cuneiform, or a rudiment of the metatarsal of the hallux, is not determinable in this skeleton, as the tarsus appears to be incomplete at its inner side. In the skull of this remarkable species of Rodent, the occipital region, owing to the enormous development of the acoustic bullæ, appears as a broad shallow depression between them at the back part of the skull. The paroccipitals are small, slender, subelongate, and project downwards, distinct from the bullæ. The broader mastoid processes are applied to the outer side of the petrosal portion of the bullæ: the swollen bases of the mastoids form a tract upon the upper surface of the cranium larger than the interparietal bone, on each side of which they are situated. The slender posterior clamping processes of the squamosals impress the outer sides of the bullæ which they support, above the 'meatus externus': this canal is directed upwards and a little outwards. The parietals are pushed by the squamosals entirely to the upper region of the cranium: the sagittal suture remains, as well as the frontal one. The temporal muscles seem to have been unusually small in this Rodent: their fossæ impress only the small squamosals. The coronoid process of the lower jaw is obsolete. The movements of the jaws

appear to have been chiefly committed to the masseteric and pterygoid muscles. The zygomatic arch, which extends from the squamosal to the premaxillary, is very broad below the orbit, and is traversed externally by a ridge indicating the powerful origin of the masseter. The antorbital vacuity and the maxillary depression, bounded externally by the two roots of the zygoma, are larger than the orbits: the upper root of the zygoma is formed by a combination of the frontal, lacrymal, maxillary and malar bones. The slender extremities of the premaxillaries terminate on nearly the same transverse line with the back part of the broad nasals. These are bent down anteriorly, so as to form the sides of the external nostrils. The deep sockets of the rootless teeth form protuberances at their bases, where the osseous case has been absorbed, in some converting the socket into a canal open at both ends, the persistent matrix of the tooth being attached to the periosteum, and protected by the contiguous soft parts. In many respects the osteology of the genus *Helamys* resembles that of the Chinchilla tribe more than of the ordinary Jerboas.

Hunterian.

Family *Jerboidæ* (Jerboas).

Genus *Dipus*.

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{2-2}{2-2}=16$.

2253. The skeleton of the Egyptian Jerboa (*Dipus sagitta*).

The most prominent peculiarities in this skeleton are, the enormous acoustic bullæ, the small antorbital foramina beneath the large antorbital vacuities, the disproportionate size and length of the hinder extremities, as compared with the fore, the large size of the ischium, as compared with the ilium, and the coalescence of the metatarsals of the three middle toes into one bone, as in Birds. The penis with its bone is attached to the pubis. The lower half of the slender fibula is anchylosed to the tibia.

Mus. Brookes.

Family *Arctomyidæ* (Marmots).

Genus *Arctomys*.

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{1-1}{1-1}$, $m\,\frac{4-4}{3-3}=22$.

2254. The skeleton of the Alpine Marmot (*Arctomys Marmotta*).

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, 3 sacral, and 23 caudal. The short and thick transverse processes of the atlas are bifid, indicating their constitution by distinct pleurapophysial and diapophysial portions. The transverse processes of the last cervical vertebra are perforated. The last five cervicals have no spines. These processes are well developed on all the dorsals, that of the second not much exceeding the others in length. The accessory tubercle appears upon the diapophysis of the ninth dorsal, and divides in the

tenth, in which the diapophysis is suddenly shortened. The metapophysis and anapophysis are distinct in the eleventh dorsal, and continue to the penultimate lumbar. Seven pairs of ribs directly join the sternum, which consists of six bones. The clavicles are complete and strong. The supraspinal fossa is broader than the infraspinal one. The spine of the scapula is lofty, but thin. The acromion is long and bifurcate, the anterior division being the longest, and curving towards the clavicle. The coracoid stands out distinctly from the inner side of the neck of the scapula. The deltoid ridge is thick, but not prominent. The humerus shows a small perforation between the condyles, and is also perforated above the inner condyle. The bones of the fore-arm admit of free rotatory movements. In the femur there is a rudiment of a third trochanter near the base of the great trochanter. The tibia is not confluent with the fibula.

Mus. South.

2255. The skull of a female Marmot (*Arctomys Marmotta*), with a mutilated occiput.

It shows the perforation in the short and broad posterior part of the squamosal. The temporal muscles were large, and their ridges meet upon the parietal. The coronoid processes of the lower jaw have a corresponding development. The interorbital part of the frontals is a broad, slightly concave platform, sending out a strong postorbital process on each side. The malar bone is long, strong, angular, forming nearly the whole of the zygoma. The antorbital foramen is unusually small: its lower border extends into a tubercle. The nasal bones pass further backwards than the premaxillaries. The bony palate is broad, and extends backwards beyond the molar series: it is terminated by two semicircular notches.

Mus. Brookes.

2256. The mutilated skull of a Marmot (*Arctomys Marmotta*), showing the chief part of the teeth *in situ.*

The cavity of the cranium is exposed, and the basisphenoid shows no trace of sella or of clinoid processes.

Hunterian.

2257. A mutilated skull of a Marmot (*Arctomys*), said to be from Valparaiso.

It agrees in size with the *Arctomys Marmotta*, but differs in the bony palate becoming narrower behind, and in its posterior notch not being divided by a median projection. The entry to the rhinencephalic chamber is also more contracted. The teeth from the right side of both upper and lower jaws are removed and separately displayed: they are numerically the same as in other species of *Arctomys*, and have short and wide-set roots.

Presented by S. P. Pratt, Esq., F.R.S.

2258. The cranium, with a mutilated occiput, of a smaller species of *Arctomys*, from Valparaiso.

It has the squamosal perforation, the broad and flat frontal platform, with strong postorbital processes, the small antorbital foramina, with the external tubercle, and the long and

broad bony palate, characteristic of the genus. The premaxillaries extend further back than the nasals, and are relatively broader at their hinder extremities. This skull is chiefly distinguished by the superior breadth of the frontals, as compared with the preceding and larger species of Marmot. The sagittal and great part of the frontal sutures are obliterated. The pituitary and chiasmal fossæ are distinct, though shallow.

Presented by S. P. Pratt, Esq., F.R.S.

2259. A mutilated cranium of another species of *Arctomys*, from Valparaiso.

It is of the same size as the preceding, but differs in the minor expanse of the frontals and the much smaller postorbital processes, in the bending forwards of the whole anterior root of the zygoma, in the form of the thin ridge defining a deep groove on its fore part, and in the greater size of the tubercle below the small antorbital foramen. The second premolar and the true molar teeth are also larger in proportion in both jaws.

Presented by S. P. Pratt, Esq., F.R.S.

2260. A mutilated skull, indicative of a fourth species of *Arctomys*, from Valparaiso.

It differs from the preceding specimen in the narrower interfrontal region, which is concave transversely instead of being convex, in the longer postorbital processes, in the larger relative size of the first premolar, and the smaller size, especially in the antero-posterior diameter, of the three succeeding grinders. The ridge from the fore part of the broad anterior root of the zygoma is sharp and produced, but not bent so far forwards, and the groove which it defines is consequently shallower. The extent of the bony palate beyond the last molar is more than equal to the breadth of that tooth. The premaxillaries and nasals terminate behind on the same transverse line. The angle of the jaw is singularly bent outwards at its extremity and bent inwards at its lower border. The enamel of the incisors is white: in the two preceding and similarly sized specimens it is deep orange.

Presented by S. P. Pratt, Esq., F.R.S.

Genus *Spermophilus*.

2261. The skeleton of the Souslik, or Siberian Marmot (*Spermophilus guttatus*).

So far as the vertebral formula can be shown, there are 7 cervical, 12 dorsal, and 7 lumbar: the sacral and caudal series are incomplete from injury.

Presented by Sir Anthony Carlisle, F.R.S.

2262. The skull of the Variegated Marmot (*Spermophilus undulatus*).

In this, as in the preceding species, the upper contour of the cranium is more convex than in the true Marmot. The squamous perforation is much reduced, and partly concealed by the hinder root of the zygoma. It is larger and more posterior in position in the *Spermophilus guttatus*. The frontals are relatively broader, and the nasals narrower in the present species.

Hunterian.

Family *Sciuridæ*.

Genus *Pteromys*.

Dental formula:—$i\,\frac{1-1}{1-1}$, $p\,\frac{2-2}{1-1}$*, $m\,\frac{3-3}{3-3}=22$.

2263. A mutilated skeleton of the Virginian Flying-Squirrel (*Pteromys volucella*).

It is chiefly remarkable for the long and strong accessory cartilage projecting from the ulnar side of the carpus, which aids in supporting the lateral fold of integument serving as a parachute to support this light and delicate species of Rodent, in its long flight-like leaps from bough to bough. Increased stiffness and resistance are imparted to the bones of the arm by the anchylosis of the radius and ulna at their distal halves. The tibia and fibula are similarly united. The antorbital vacuities are reduced to minute foramina, and present the opposite extreme in this species to their condition in the Cavies and Porcupines.

Mus. Brookes.

Genus *Sciurus*.

Dental formula as in *Pteromys*.

2264. The skeleton of the Great Squirrel of Malabar (*Sciurus maximus*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 3 sacral, and 24 caudal. In the cervical series only the second and the seventh vertebræ have spines. The transverse processes of the seventh are imperforate. The spines of the seven anterior dorsals are subequal, the rest gradually diminish in length: that of the eleventh is the one towards which the spines of the other trunk-vertebræ converge. The ridge developed upon the diapophysis of the seventh dorsal rapidly expands in the succeeding ones, and divides in the tenth: the metapophysis and anapophysis become distinct in the eleventh, and are continued throughout the lumbar series. Seven pairs of ribs directly join the sternum, which consists of six bones. The acromion is bent almost at right angles with the spine of the scapula, and it terminates in three prominences: the coracoid is unusually long. The clavicles are entire. The humerus is perforate above the inner condyle, but not between the condyles. In the femur the small trochanter is unusually prominent: there is also a trochanterian ridge below the base of the great trochanter.

Mus. South.

2265. The skull of the *Sciurus maximus*.

The occipital region is low and broad. The paroccipital and mastoid processes are small, but distinctly developed, the paroccipitals being the longest. The occipital condyles are slender. The auditory bullæ are large, the meatus appearing as a circular piece cut out of the wall, which is not prolonged into a tube. The posterior process of the squamosal is

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* The anterior of these premolars is small, and is soon shed.

moderately broad, and extends to the occipital ridge, where it joins the superoccipital and mastoid. There is no trace of interparietal. The frontal and sagittal sutures are obliterated, and the frontals and parietals form a broad, smooth, continuous tract of bone, nearly flat between the orbits, which the frontals define by large and long postorbital processes. The sigmoid temporal ridges define the upper from the lateral surfaces of the parietal. The malar is slender, but expands into a slight orbital angle. There is a distinct lacrymal, with a small facial portion wedged between the frontal and maxillary. The antorbital foramina are contracted, and defended externally by a short ridge directed forwards. The nasals in this skull do not extend quite so far back as the premaxillaries. In the skeleton these bones terminate on the same transverse line, and the nasals are more expanded and bent down anteriorly. The coronoid process is well developed; the angle and external ridge leading from it are less marked than in most other Rodents.

Mus. Brit.

2266. The skull of the Java Squirrel (*Sciurus bicolor*).

The teeth are removed from the right side of both upper and lower jaws, and separately displayed. In this skull the borders of the external meatus are more developed, and are notched inferiorly. The squamosal has been removed on each side, showing the vacuity between the alisphenoid, parietal and petromastoid, which it covers. The basioccipital has a median and two lateral ridges: against the latter the petrosals abut. The pterygoids do not reach the petrosals. The bony palate extends backwards beyond the molar series. The small antorbital fissure is not defended by the production of its outer boundary, but a tubercle is developed from its lower part.

Hunterian.

2267. The skull of the Hudson's Bay Squirrel (*Sciurus Hudsonius*).

The teeth are removed from the left side of both upper and lower jaws, and are separately displayed.

Hunterian.

2268. The skeleton of the common Squirrel (*Sciurus vulgaris*).

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, 4 sacral, and 21 caudal. Eight pairs of ribs directly join the sternum, which consists of seven bones. There is an accessory ossicle between the scaphoid and trapezium. The pollex is very short and thick. The hallux extends to the second joint of the index. The two fabellæ are preserved behind the condyles of the femur. The interspace between the ninth and tenth dorsals is that towards which the spines of the other trunk-vertebræ converge. The anapophyses are suppressed on the last two lumbar vertebræ. The characters of the humeri and femora, noticed in No. 2264, are repeated in this skeleton.

Mus. South.

The following are parts of the same skeleton of a common Squirrel (*Sciurus vulgaris*):—

Hunterian.

2269. The last six dorsal and first three lumbar vertebræ.

They show the progressive metamorphosis of the accessory tubercle into the metapophysis and anapophysis, which coexist with the diapophysis upon the ninth dorsal. The diapophysis subsides into a feeble ridge in the three following vertebræ, but reappears and rapidly increases in size in the lumbar series. The convergence of the spines towards that of the ninth dorsal is well shown in this series.

2270. The left humerus.

It shows the perforation and the characteristic form of the inner condyle.

2271. The left radius and ulna.

These are remarkable for the extent to which they are joined together at their distal extremities.

2272. The bones of the right hinder extremity.

They show the fabellæ and the interarticular cartilages of the knee-joint.

The following are parts of the same skeleton of the Grey Squirrel (*Sciurus cinereus*) :—

Hunterian.

2273. The cranium, vertically bisected.

There are two perforations in the squamosal above the tympanic.

2274. The rami of the lower jaw.

2275. The five anterior cervical vertebræ.

The vertebral artery has been injected and preserved, to show its course through the transverse processes of these vertebræ, and through the neural arch of the atlas.

2276. The remaining vertebræ of the trunk, the pelvis, and base of the tail.

The seventh cervical has a small tubercle above the neural arch, not a spine. The spine of the first dorsal is short and inclined forwards; those of the second and third are of nearly equal length, and the rest gradually become shorter. Eight pairs of ribs directly join the sternum, which consists of seven bones: the manubrium is strongly carinate below. There are 12 dorsal and 7 lumbar vertebræ. The interspace between the ninth and tenth dorsal is that towards which those of the other trunk-vertebræ converge. The metapophyses are first distinct upon the tenth dorsal. The anapophyses disappear in the last lumbar. The first

caudal hæmal arch is attached below the interspace between the third and fourth caudals. The epicotyloid tubercle is strongly developed: the ilia articulate with the first sacral vertebra exclusively, but the ischia abut against the long transverse processes of the first caudal: beyond this vertebra the ischia develope on each side two tuberosities, one at the usual place, the other and stronger one near the lower end of the symphysis.

2277. The left scapula.

It is remarkable for the number and strength of the intermuscular cristæ: of these, that which is commonly called the 'spine' is the largest, its breadth being equal to that of the infraspinal fossa: this fossa is bounded by a second ridge, formed anteriorly by the outwardly bent lower costa, but being distinct from the costa at its posterior third. The two principal masses of the 'subscapularis' muscle were divided by a longitudinal crest, like the spine, rising from the inner surface of the scapula. Both the acromion and coracoid are well developed.

2278. The left clavicle.

2279. The left humerus.

It is perforated above the inner condyle: this is a tuberosity which appears to be supported by four converging columnar ridges or processes. The deltoid and supinator ridges are well marked.

2280. The left ulna.

The shaft is much compressed.

2281. The left radius.

2282. The left femur.

It shows the almost equal development of the three trochanters. The medullary artery enters on the inner side of the shaft, just below the small trochanter.

2283. The left tibia and fibula with the interarticular ossicle of the knee-joint.

2284. The left tarsus and metatarsus.

There is an accessory ossicle wedged between the calcaneum, astragalus, naviculare, and entocuneiforme.

2285. The right astragalus.

Its anterior articulation is expanded, and seems to be supported on a neck. The tibial trochlea is unusually oblique in reference to the grasping power of the hind foot.

2286. The right calcaneum, with the scaphoid, cuboid, and internal accessory ossicle.

The following are parts of the same skeleton of the Grey Squirrel (*Sciurus cinereus*) :— *Hunterian.*

2287. The sacrum.

2288. The right os innominatum.

This shows the ordinary ischial tuberosity between the one which articulates with the first caudal vertebra and that which is next the symphysis.

2289. The caudal vertebræ.

These are 26 in number. The posterior ones are remarkable for their length and tenuity, having to sustain only the light bushy tail. This serves as a balancer in leaping, and as a blanket when the animal sleeps.

Order BRUTA. (Edentata, Cuvier.)

Genus *Dasypus.*

2290. The skeleton of the Weasel-headed Armadillo (*Dasypus sexcinctus*).

The vertebral formula is :—7 cervical, 11 dorsal, 3 lumbar, 9 sacral, and 16 caudal. The second and third cervicals have coalesced together, and they develope a strong confluent neural spine. The last four cervicals are without those spines, and are equally devoid of zygapophyses. The diapophysis of the last cervical contributes to the articular cavity for the tubercle of the first dorsal rib, which is enormously expanded; and the anchylosed pleurapophysis of the seventh cervical projects backwards beneath the head of the first dorsal rib. The neurapophyses of the middle dorsal vertebræ are directly perforated for the spinal nerves. Anapophyses are developed from behind the diapophyses of the first three dorsals; they decrease in size in the succeeding dorsals, but again increase in the posterior dorsals and in the lumbar vertebræ, where they present an articular surface to the metapophysis of the succeeding vertebræ. The metapophyses commence as ridges on the upper surface of the diapophyses of the second and third dorsals; they form prominent tubercles on the seventh

and eighth dorsals, and rapidly elongate in the succeeding vertebræ, where they surpass in length and equal in thickness the neural spines. They are much diminished in length in the first sacral vertebra. Each of these elongated metapophyses presents a distinct articular surface to an accessory posterior zygapophysis; and on its opposite side an articular surface to the subjacent anapophyses of the preceding vertebra, producing two additional pairs of joints to the normal ones formed by the anterior and posterior zygapophyses.

The parapophyses of the lumbar vertebra do not materially increase in length, but chiefly in antero-posterior extent, overlapping each other, the back part of the anapophysis of the last dorsal resting on the fore part of the parapophysis of the first lumbar vertebra, and the parapophyses of the last lumbar vertebræ similarly articulating with a prominence of the iliac bone; an additional pair of articulations being thus formed externally to those between the anapophyses and metapophyses.

The long sacrum has coalesced with both the iliac and ischial bones. The pubic bones complete a wide arch by their confluence at their slender symphysis. The ischiatic notches are converted into foramina, which are inferior in size to the foramina obturatoria. The spines of most of the sacral vertebræ form by their confluence a continuous ridge. The strong tuberosity of the ischium is bifid. The zygapophyses are developed and coarticulated in the first five caudal vertebræ. The anterior ones support short and thick metapophyses, and these are continued in the succeeding caudal vertebræ, after the anterior zygapophyses have disappeared.

The hæmal arch ceases upon the seventh caudal vertebra. Hæmal arches are articulated to the inferior interspace of the caudal vertebræ, as far as that between the ninth and tenth. The clavicles are complete. The scapulæ are unusually convex externally, and present two ridges or spines, the normal one of which is produced into a very long acromion: the coracoid curves downwards: there is a well-marked tubercle behind the neck of the scapula. The humerus is remarkable for its strength and for the great development of the deltoid ridges. It is perforated above the inner condyle, but not between the condyles. The ulna is considerably longer and stronger than the radius. The olecranon is remarkably developed. The femur presents a long and strong third trochanter. The fibula approaches the tibia in size, and is anchylosed to it at both extremities.

Purchased.

2291. The skull of the Weasel-headed Armadillo (*Dasypus sexcinctus*), with the prominent part of the right frontal removed, exposing the rhinencephalic and olfactory chambers. *Presented by the Zoological Society of London.*

2292. The skull of the *Dasypus sexcinctus* vertically bisected.

The petrosal presents a wide and shallow cerebellar fossa: the canal between the petrosal and the angle of the superoccipital gives exit to a vein from the lateral sinus and an entry to an artery which emerges from the interior of the cranium between the petrosal and squamosal. The rhinencephalic almost equals the epencephalic division of the cranial cavity in size. The olfactory chamber extends backwards to beneath the prosencephalic division, and the eth-

moidal part of the olfactory capsule is very extensive and complex. The turbinal is comparatively simple. The turbinal plate of the nasal almost equals the facial plate in extent. Of the nine teeth in each upper jaw the first is implanted in the premaxillary, and is to be regarded therefore as an incisor: the next represents a canine, and the remaining seven give the normal numerical condition of the four premolars and three true molars: but these teeth derive no specific or distinctive characters from form, structure, or mode of development. They are without fangs, retain a wide basal pulp-cavity, or a persistent matrix, and consequently enjoy perpetual growth; they diminish in size towards the two ends of the series. The lower jaw has ten of these teeth on each side, the two anterior being incisors by virtue of their relative position to the first tooth above: the next, like a lower canine, is in advance of the upper one when the mouth is closed, and thus the number of teeth, answering to premolars and molars in the normal dentition, is again repeated in the lower jaw. The teeth are removed and separately displayed from the left side of both upper and lower jaws. The constituent bones of the cranium are numbered on coloured labels according to the Table of Synonyms.

Presented by Prof. Owen, F.R.S.

2293. The bones of the fore-foot of the *Dasypus sexcinctus*, naturally articulated.

Presented by Prof. Owen, F.R.S.

2294. The bones of the right hind-foot of the same *Dasypus sexcinctus*, naturally articulated.

The scaphoid not only sends downwards a compressed subelongate process to the under part of the tarsus, answering to that which is so conspicuous in the Rodents, but also sends inwards a large, obtuse, prominent process, occupying the interspace between the entocuneiform and astragalus, where the accessory tarsal ossicle is formed in most Rodents.

Presented by Prof. Owen, F.R.S.

2295. The osseous tessellated casque or helmet formed by the exoskeleton of the head (*Dasypus sexcinctus*). *Presented by Prof. Owen, F.R.S.*

2296. The skeleton of the Nine-banded Armadillo (*Dasypus Peba*).

The vertebral formula is:—7 cervical, 10 dorsal, 5 lumbar, 8 sacral, and 16 caudal. The spine of the dentata is compressed, lofty, and developed backwards beyond those of the third and fourth cervicals, with which it has partially coalesced: a corresponding partial coalescence has taken place between the bodies of these vertebræ, which are unusually broad and flat below. The diapophysial part of the transverse processes of the last cervical extends upwards, outwards and backwards, and abuts against the fore part of the tubercle of the first broad dorsal rib: the pleurapophysial part of the same transverse process is broad and short, and extends downwards in front of the same rib. The last three cervicals have no spinous processes; that of the first dorsal rises to a considerable height, and those of the remaining dorsals and lumbar vertebræ attain the same horizontal line, except the last, which inclines

more towards the sacrum. The metapophysis is first fully developed upon the seventh dorsal, and progressively elongates to the last lumbar, where it exceeds the spinous process in length. It presents an articular surface at the under and fore part of its base to be articulated with the anapophysis of the antecedent vertebra. These anapophyses increase in thickness rather than in length in the succeeding vertebræ, and upon the last dorsal present an articular surface at their under part for connection with a parapophysis. These accessory joints coexist with the ordinary articulations between the anterior and posterior zygapophyses, and there are consequently twelve joints between each pair of vertebræ, in addition to the ligamentous one between the bodies of the vertebræ. This mechanism is designed to give great strength and fixedness to the vertebræ of the trunk in relation to the support of the bony carapace, and to the affording a firm fulcrum or centre to the powerful muscular forces exercised by the limbs in the act of burrowing. The elongated metapophyses have a more direct relation to the support of the carapace, the spinous processes representing the 'king-posts,' and the metapophyses the 'tie-beams' in the architecture of a roof. The sacral vertebræ progressively increase in breadth after the second, to form an extensive juncture with the ischial bones. The tuberosities of the ischia, and similar tuberosities at the fore part of the ilia, bend outwards and upwards, to afford four strong additional supports to the bony carapace: the long diapophyses of the first caudal vertebra abut against those of the last sacral vertebra and the tuberosities of the ischia. The metapophyses reappear upon the second caudal vertebra, and continue to the antepenultimate one, where they are reduced to ridges upon the anterior zygapophyses.

The posterior dorsal ribs are deeply excavated upon their external surface; five pairs directly join the sternum, which consists of six bones, a very small one being interposed between the fourth and the long one supporting the ensiform cartilage. The clavicles are complete. The acromion is bifurcate, the longest division arching forwards and downwards to meet the clavicle. The humerus is perforate above the inner condyle. The ulna is remarkable for the length and strength of its olecranon. There are four digits on the fore-foot, the two middle much exceeding in length and strength the outer and inner ones. The femur has a third trochanter. The tibia and fibula have coalesced at both extremities. There are five digits on the hind-foot.

The dental formula is :—$\frac{8-8}{8-8}=32$. None of the teeth are implanted in the premaxillaries. The chief expansion of the cranium is for the lodgement of the capacious olfactory capsules. The elements of the occipital bone have not coalesced: the superoccipital developes a pair of strong tuberosities at its upper part.

Mus. Brookes.

2297. The vertebra dentata and five following cervical, with fourteen dorso-lumbar vertebræ of the *Dasypus Apar.*

The spine of the third cervical has completely coalesced with that of the dentata, which is thick and high, but more extended forwards than backwards. The spine of the fourth cervical is applied to its back part. The neural arches of the succeeding cervicals have no spines, but form thin transverse bars of bone, which in the middle are incomplete above the fifth and sixth cervicals, upon which the antecedent vertebræ are strongly bent backwards.

Their bodies are extremely broad in proportion to their length or antero-posterior diameter. The articular bed for the head and tubercle of the first dorsal rib is contributed to, in equal shares, by the last cervical and first dorsal vertebræ. Ten vertebræ show the impression of the articulation of the head of the rib in addition to the first dorsal, and the neurapophyses of these eleven dorsal vertebræ are directly perforated by the spinal nerves. The articulation for the last rib is as equally divided between the two contiguous vertebræ as is that of the first rib. The prominence supporting the articular surface for the head of the rib answers to the 'parapophysis,' just as the prominence supporting the articulation for the tubercle of the rib, represents the 'diapophysis.' The prominence in the first lumbar vertebra which articulates with the under part of the anapophysis of the last dorsal, repeats, or tallies with, the prominence in that dorsal which articulates with the head of the last rib: it is, therefore, a 'parapophysis.' The diapophysis projects, as in the dorsal vertebræ, from the upper and outer part of the base of the short and thick anapophysis, and this anapophysis presents, as in other Armadillos, two articular surfaces: one, above, for the under part of the metapophysis; another, below, for the upper part of the parapophysis. Thus, the vertebræ are interlocked by tenon-and-mortice joints, as Cuvier has described; but it is by distinct parts of the vertebræ from those which form the corresponding joints in the back bone of serpents.

This and the following parts of the same skeleton were presented by Charles Darwin, Esq., F.R.S.

2298. The pelvis of the same Armadillo.

The sacrum includes 12 vertebræ, the spines of which unite to form a continuous bony crest. The anterior tuberosities of the ilia and the posterior tuberosities of the ischia are distinct epiphyses in this young specimen: the former are supported by the metapophyses of the first sacral vertebra, which also developes laterally two articular parapophyses. Ossification has not so far advanced as to unite the pubic bones together at the symphysis. The posterior sacral vertebræ present the same remarkable breadth which characterizes the other species of the genus *Dasypus*.

2299. The manubrium sterni of the same Armadillo, with the first pair of dorsal ribs and the ossified cartilages of the two succeeding pairs. These hæmapophysial portions of the costal arches are much longer than those of the first rib.

2300. The left humerus of the same Armadillo: it is short, thick, strongly curved, with prominent deltoid and supinator ridges, and is perforated above the inner condyle.

2301. The left ulna of the same Armadillo.

2302. The left radius of the same Armadillo.

2303. The left tibia and fibula of the same Armadillo. A single epiphysis is applied at both their extremities to the shafts of the two bones.

2304. The bones of the left fore-foot of the same Armadillo.

The four carpal bones of the proximal row are distinct from one another: the os magnum in the second row has coalesced with the metacarpal of the enormously developed digitus medius. The base of the metacarpal of the index is wedged between that metacarpal, the trapezoides, and the trapezium. The unciforme also supports part of the middle metacarpal as well as the short cubical metacarpus of the fourth finger and the rudiment of that of the fifth. The index digit has three phalanges. The medius and annulus have each but two, and resemble each other in the character of their modifications, although greatly differing in size. The chief peculiarity, however, in this specimen is the very large sesamoid bone developed in the flexor tendons, and filling the palmar aspect of the fore-foot: a second sesamoid is attached by ligament to the apex of the large palmar one.

2305. The bones of the left hind-foot of the same Armadillo.

The scaphoid is remarkable for its two inferior tuberosities, the interspace between which receives the under part of the entocuneiform bone. The metatarsals and the phalanges of the three middle digits are preserved, with the ungual phalanx of the innermost one or hallux.

2306. The cranium of the *Dasypus minutus*; showing the sockets of the eight teeth on each side, of which the first, being behind the premaxillary suture, represents that of a canine. *Presented by Charles Darwin, Esq., F.R.S.*

2307. The skull of the Three-banded Armadillo (*Dasypus tricinctus*).

The tympanic is a distinct lamina of bone bent in a half-circle: the membrane connecting its inner and under border with the lower part of the petrosal is not ossified so as to form a continuous tympanic bulla, as in the *D. Peba*. The mastoid is also distinct, is perforated by a vein from the lateral sinus, and terminates below in the usual process. There is no paroccipital. The lacrymal bone is large, and forms a triangular plate upon the face outside the orbit. The alisphenoids join the parietal: the chief expansion of the skull is for the lodgement of the large olfactory capsule. There are two small prenasal ossicles. There are no teeth in the premaxillary bones, but nine on each side the maxillaries, and the same number on each side the lower jaw.

This and the following parts of the same skeleton were presented by Charles Darwin, Esq., F.R.S.

2308. The atlas of the same Three-banded Armadillo.

It has no large transverse processes: the sides of the vertebræ appear to be truncate; they present near the back part a rudiment of a parapophysis and diapophysis. The side of the vertebra is perforated anterior to them, and leads to a canal which bifurcates, one branch terminating within the neural arch, above the articulation for the condyle, and the other perforating the neural arch. There is also a foramen at the back part of the hæmal arch, above the articular surface for the odontoid. There is no spine either above or below the vertebral ring.

2309. The fourteen caudal vertebræ of the same Armadillo.

The transverse processes are long, broad, and depressed, with their outer ends swollen into a rugous kind of exostosis. The hæmal spines of the last five vertebræ present a similar modification at their extremities, which relates to the attachment of the dermal bony sheath of the tail. Metapophyses begin to be developed upon the two caudal vertebræ, and continue after the anterior zygapophyses have disappeared on the seventh caudal. Hæmapophyses are articulated to the interspaces between the second and third, and so on to the seventh caudal vertebræ inclusive, and in the following vertebræ are directly articulated to the under part of the centrum: they are flattened and expanded beneath.

2310. The right scapula and clavicle of the same Armadillo.

The clavicular half of the long acromion is an epiphysis. The coracoid is short and obtuse. There is a tubercle beneath the glenoid cavity. The suprascapular element is represented by a subtriangular coarsely ossified cartilage attached to the base of the scapula.

2311. The right humerus of the same Armadillo. It is perforated above the inner condyle.

2312. The right radius, ulna, and bones of the fore-foot of the same Armadillo.

The scaphoid is the smallest of the four bones of the proximal row. The large pisiform articulates to the posterior interspace between the lunare and cuneiforme, and forms with the lunare a large articular cavity, upon which the palmar patella plays. There is no distinct trapezium: if its homologue exist in rudiment, it is connate with the trapezoides. The magnum has coalesced with part of the base of the great cubical metacarpal of the digitus medius. The outer part of the base of that metacarpal rests upon the unciforme, which also supports the small but thick cubical metacarpus of the annularis, and the rudiment of the metacarpal of the minimus. The medius and annularis have each but two phalanges; the long and slender index retains the normal number of three phalanges.

2313. The right femur of the same Armadillo.

The shaft is bent inwards above the base of the third trochanter. There is a small ossification at the middle of the outer semilunar cartilage. The tibia and fibula are attached at both ends to a similar common epiphysis.

2314. The left femur of the same Armadillo, in longitudinal section.

2315. The exoskeleton of the same Armadillo, forming the supracranial casque and the carapace.

The latter has three of its middle segments moveable, allowing the inflection of the trunk and its complete protection by the approximation of the anterior to the posterior division of the carapace.

The following parts of the same skeleton of the *Dasypus minutus* were

Presented by Charles Darwin, Esq., F.R.S.

2316. The two rami of the lower jaw, in each of which there are nine alveoli: the first and smallest is situated on the symphysis.

2317. The atlas of the same Armadillo.

It has both parapophysis and diapophysis. The neural arch has two perforations on each side; the hinder one for the nerve, the front one for the vertebral artery.

2318. The axis and two succeeding cervical vertebræ.

The confluence is complete with the third vertebra, and is partial between the third and fourth vertebræ.

2319. The three remaining cervical vertebræ.

The neural arch is incomplete above in the sixth, and the harmonia between the right neurapophysis and centrum still remains in the sixth and seventh vertebræ. The transverse process of the seventh is imperforate.

2320. The first dorsal vertebra, which is characterized by its long and slender spine. The nerve perforates the base of the neurapophysis.

2321. Three succeeding dorsal vertebræ, showing the same direct perforation below

the diapophysis, with a second perforation of the neural arch behind that process. Rudiments of metapophyses and anapophyses are present in the last of these vertebræ.

2322. Four middle dorsal vertebræ, including the sixth to the ninth.

The simple metapophysis of the sixth dorsal vertebra begins to articulate with the anapophysis of the fifth: the extent of this articulation progressively increases in the succeeding vertebræ, and in the eighth and ninth a second articular surface is developed on the inner side of the base of the metapophysis which articulates with a new surface developed upon the outer side of the posterior zygapophysis; the ordinary surface on the under part of this process continuing and resting upon the ordinary surface of the anterior zygapophysis. The second nervous perforation, noticed in the first dorsal vertebra, directly traverses the anapophysis in the present vertebra.

2323. The last two dorsal and the three lumbar vertebræ.

In the last dorsal the anapophysis developes a second articular surface from its under part, which joins a surface upon the upper part of the diapophysis of the first lumbar vertebra, so that they are united by a double tenon-and-mortice joint on each side, in addition to the articulations between the ordinary zygapophyses. The metapophyses in the present five vertebræ exceed the neural spines in length as much as the anapophyses surpass them in breadth and thickness. In the lumbar vertebræ the nerves escape by a conjugational hole, and the anapophyses are notched, not perforated.

2324. The eight sacral and first caudal vertebræ.

The first sacral is as complex as the last lumbar, but its metapophyses are shorter, and its spine reduced to a ridge. The base of the metapophysis presents, however, the inner and the inferior articular surface, and the diapophysis developes the superior articular surface, forming the tenon for the reception of the short and thick biarticular anapophysis of the last lumbar, between which and the posterior zygapophysis is the tenon reciprocally receiving the base of the metapophysis of the first sacral vertebra.

2325. The manubrium sterni, showing the two clavicular processes.

2326. The right scapula. It is remarkable both for the length of the acromion and of the coracoid.

2327. The right clavicle.

2328. The right humerus. It is perforated above the inner condyle.

2329. The right ulna.

2330. The right radius.

2331. The metacarpal and three phalanges of one of the toes, showing the extreme shortness of the proximal phalanx, and the transverse perforation of the last phalanx.

2332. The right os innominatum.

2333. The right femur, showing the large and deep cavity for the ligamentum teres, and the great development of the three trochanters.

2334. The right tibia and fibula. Their proximal and distal extremities are connate: their shafts subsequently coalesce with these extremities, so that a single epiphysis answers to the shafts of both bones at each of their extremities.

2335. The astragalus, calcaneum and cuboides.

Genus *Orycteropus*.

2336. The skeleton of the Cape Ant-eater (*Orycteropus capensis*).

The vertebral formula is :—7 cervical, 13 dorsal, 8 lumbar, 6 sacral, and 25 caudal. The transverse process of the atlas is perforated longitudinally and grooved anteriorly by the vertebral artery before it penetrates the neural arch, the perforation being half-way between the anterior and posterior borders. There is a small spine upon the arch: the hæmal spine of the dentata extends backwards over that of the third cervical, which, with that of the sixth cervical, is shorter than the rest. The transverse processes of the middle cervicals are developed forwards and backwards, and overlap each other. The costal part of that of the sixth cervical is a distinct broad plate. The spines of the dorsal and lumbar vertebræ are all much longer than those of the cervical, and are subequal: they slightly converge to that of the twelfth dorsal, which is vertical, indicating a greater extent of inflection of the trunk than in the great South American Ant-eater; increased freedom of motion is likewise favoured by the less complex character and mode of union of the vertebræ. An accessory tubercle is developed upon the diapophysis of the seven anterior dorsal vertebræ, which divides near the eighth into metapophysis and anapophysis. These progressively increase and diverge from one another in the succeeding dorsals, and in the first lumbar vertebra the metapophysis projects upwards, outwards and forwards upon the outside of the anterior zygapophysis; whilst the anapophysis extends backwards from the back part of the diapophysis, which it equals

in length. The anapophysis decreases in size in the following lumbar vertebræ and disappears in the last; the metapophysis also decreases in size, but is continued throughout the lumbar series and along part of the sacral. The transverse processes of the three anterior sacrals join the ilia; those of the three posterior ones coalesce to form a broad depressed plate, with the posterior angles produced, but not joining the ischia. A long and strong process is sent out from above the tuber ischii. Metapophyses are developed from the outside of the anterior zygapophyses, as far as these extend along the caudal series, viz. to the eighth vertebra; beyond these the metapophyses are developed, independently of the zygapophyses, to near the termination of the tail. The hæmal arches commence below the interspace between the second and third caudals, and are continued as far as that between the sixteenth and seventeenth. The neural arch disappears upon the sixteenth caudal vertebra. The hyoid arch is preserved in this skeleton, and consists of the stylohyal, ceratohyal, epihyal, and basihyal elements, with the appended thyrohyals, or 'cornua majora.' The clavicles are complete: the humerus is perforated above the inner condyle. There is a fabella behind the outer condyle of the femur. Other modifications of the locomotive extremities, with the chief characters of the cranium, have been described and figured by Cuvier in the 'Recherches sur les Ossemens Fossiles,' tom. v. pt. 1.

Purchased.

The following are parts of the same skeleton of the *Orycteropus capensis*:—

Mus. South.

2337. The mutilated skull.

The petromastoid and tympanic are distinct from each other, and retain their primitive separation from the squamosals. The occipital condyles are bilobed, the inferior and smaller lobe being developed from the basioccipital. The zygomatic arch is slender, but entire. The calvarium has been removed, showing the well-marked venous fossa, which depresses the inner border of the foramen magnum; the large and moderately deep sella, with anterior and posterior deep clinoid processes, bounded on each side by the carotid channels, external to which are the deeper Gasserian fossæ. There are few mammalian skulls in which the cranial cavity is more equally divided into the epencephalic, mesencephalic, prosencephalic and rhinencephalic chambers; but the mesencephalic chamber contains not only the proper mesencephalon, but also, as in other Mammalia, part of the backwardly developed prosencephalon, and especially those inferior protuberances called 'natiform.' The petrosals show very narrow cerebellar fossæ.

2338. The right ramus of the lower jaw, with the five teeth exposed *in situ.*

The four posterior teeth have been longitudinally bisected, showing their solidity and uniform diameter: the appearance of fangs, and of the pulp-cavity in the third, is due to the section being carried through the bottom of one of the lateral grooves, which indents the exterior of this and the succeeding tooth. In the upper jaw there is a small tooth anterior to the five corresponding to those below, and also the indication of a more minute rudimental tooth in advance.

2339. The seven cervical vertebræ.

2340. The thirteen dorsal vertebræ, with the thirteen pairs of ribs attached to them and to the sternum.

2341. The eight lumbar vertebræ.

2342. The sacrum and pelvis.

2343. Twenty-four caudal vertebræ.

2344. The right scapula.

2345. The right clavicle.

2346. The right humerus.

2347. The right ulna.

2348. The right radius.

2349. The right carpus, metacarpus and phalanges, articulated.

2350. The left scapula and clavicle, articulated.

2351. The left humerus, vertically bisected.

2352. The left radius, vertically bisected.

2353. The left ulna, vertically bisected.

2354. The left carpus, metacarpus and phalanges, articulated.

2355. The left femur.

2356. The left tibia and fibula, anchylosed.

2357. The left patella.

2358. The left tarsus, metatarsus and phalanges, articulated.

2359. The right femur, longitudinally bisected.

2360. The right tibia and fibula, longitudinally bisected.

2361. The right patella of the same.

2362. The right tarsus, metatarsus, and phalanges.

Genus *Manis.*

2363. The disarticulated skeleton of the Short-tailed Manis (*Manis pentadactyla,* Linn.).

The cranium is chiefly remarkable for the inclination of the occipital surface from below upwards and forwards, the plane of the foramen magnum being slightly inclined in the same direction. The mastoids form two hemispheric protuberances at the sides of the occipital region, and the tympanics two smaller protuberances at the sides of the base of the skull: the pterygoids extend backwards beyond them, and form the sides of a deep and wide postnasal groove. The zygomatic process of the squamosal extends but little beyond the joint for the lower jaw, and, as there are no malar bones, the arches are incomplete. There are no lacrymals. There are no teeth; but two tooth-like processes project from the fore-part of the alveolar border of the slender under-jaw. The premaxillaries join the nasals. The transverse process of the seventh cervical is perforated: its spine is longer than that of the others. There are 13 dorsal vertebræ. The nine anterior pairs of ribs directly articulate with the sternum, which consists of ten bones. The tenth is of unusual length, and supports a still longer and much-expanded xiphoid cartilage. The metapophyses commence as tubercles on the first dorsal vertebra, and rapidly increase in size in the succeeding vertebræ. The anapophyses are not developed in this Edentate. There are 4 lumbar, 4 sacral, and 26 caudal vertebræ. The metapophyses continue to be developed from the sacral series. The transverse processes of the last sacral suddenly expand both in length and breadth, and articulate with the tuberosities of the ischium. Well-developed hæmal arches are articulated to the inferior interspaces of the caudal vertebræ as far as the penultimate one. The anterior zygapophyses cease upon the fourteenth vertebra, but the metapophyses are continued as far as the penultimate caudal. The neural arch gradually subsides and disappears upon the twentieth caudal vertebra, which consists of centrum, diapophyses, metapophyses, and the hæmal arch. The spine of the scapula is not prolonged into an acromion, and there are no clavicles: the coracoid is represented by a small distinct tubercle, forming the anterior extremity of the elliptical glenoid cavity for the humerus. The humerus is perforated at the internal condyle. There is an articular sesamoid developed on the outer side of the capsule uniting the radius with the humerus. The femur has no third trochanter. There is a sesamoid or fabella developed from the capsule of the knee-joint behind the outer condyle of the femur. The extremity of the fibula beyond the outer malleolus bends inwards, and terminates in a tuberosity playing in a cavity upon the outer side of the astragalus. There is an accessory tarsal ossicle on the inner side of the entocuneiform and scaphoid. The ungual phalanx of the hallux is simple; those of the three middle toes are cleft at the apex.

Mus. Howship.

2364. The natural skeleton of a young Long-tailed Manis (*Manis longicaudata*).

There are 7 cervical vertebræ and 18 dorso-lumbar vertebræ. Eleven pairs of ribs have been preserved. The neurapophyses of the trunk-vertebræ have not quite coalesced at their apices. Two vertebræ articulate with the ilium. These are succeeded by 39 caudal vertebræ, some of the anterior of which, being subsequently modified by anchylosis, enter into the artificial group of sacral vertebræ. The exoccipitals meet above the large vertical foramen magnum. The superoccipital is rhomboidal, and its aspect is almost wholly upwards. The tympanic bone forms the lower boundary of a hemispheric bulla, which communicates with an equal-sized cavity in the squamosal; a narrow strip of the petrosal intervenes between the tympanic and the broad basioccipital. The small lacrymal is wedged in between the frontal and maxillary at the anterior angle of the orbit, but there is no trace of a malar bone. One of the slender edentulous rami of the mandible is preserved.

Mus. Brookes.

Genus *Myrmecophaga.*

2365. The skeleton of the Tamandua Ant-eater (*Myrmecophaga Tamandua*).

The vertebral formula is:—7 cervical, 17 dorsal, 2 lumbar, 5 sacral, and 37 caudal vertebræ. All the cervical vertebræ have spinous processes except the atlas; that of the dentata is produced forwards, not backwards, and those of the sixth and seventh cervicals are as long as the spine of the first dorsal, which exceeds in length that of any of the other vertebræ. The pleurapophysial part of the transverse process of the dentata is broad, and produced downwards and outwards: it increases in length and breadth in the four succeeding vertebræ, in the last three of which the diapophysial element of the process stands out distinctly and strongly. In the seventh cervical this element alone is developed, and the transverse process is accordingly said to be imperforate. A metapophysial tubercle is developed from the outer side of the prozygapophysis of the last five cervicals. The diapophyses of all the dorsals present an articular surface for the tubercle of the rib. The metapophysial tubercle is continued from the cervical to the dorsal region, appearing there upon the upper part of the diapophyses of the first dorsal; it continues increasing in size and length to the thirteenth dorsal, where it begins to shift its position, and in the remaining dorsals projects midway between the diapophysis and zygapophysis. In the fourteenth dorsal the metapophysis also increases suddenly in breadth, and developes an articular surface from its inner side to join an accessory posterior zygapophysis, as well as an articulation upon its fore and under part for the anapophysis of the preceding vertebra. In the fourteenth dorsal the anapophysis suddenly acquires increased length and breadth, with a distinct articular surface upon both its upper and under part, the upper one articulating with the metapophysis, the under one with the parapophysis of the succeeding vertebra. Thus there are not fewer than sixteen co-adapted articular surfaces, in addition to those for the head and tubercle of each rib and the articulations between the ends of the centrum of one and the same vertebra. In the first lumbar vertebra the diapophysis increases in thinness and decreases in length, presenting the form of a depressed plate; the other processes with thin articular surfaces are retained in

both lumbar vertebræ. Parapophyses and metapophyses are also developed from the fore part of the first sacral vertebra, together with another accessory process extending to the parapophyses, projecting from the fore part of the diapophyses, and presenting an articular surface to a corresponding accessory articulating process for the anapophysis of the last lumbar. The neural spines of the five sacral vertebræ have coalesced into a continuous ridge, on each side of the base of which are the tubercular representations of the metapophyses. The transverse processes of the last sacral are enormously expanded, and develope from their under part a broad rough prominence for syndesmosis with the anterior tuberosity of the ischium. The posterior and ordinary tuberosity of that bone projects freely outwards beneath the transverse processes of the first caudal. The metapophysial tubercles begin to be developed from above the prozygapophyses from the first to the eighteenth caudal, beyond which the metapophyses exclusively represent the articular processes. The broad transverse processes have an accessory tubercle near their extremities, as far as the sixth caudal; at the seventh they are notched at their extremities, and the notch deepens until it divides the diapophyses into two in the eighteenth vertebra, and so on till they disappear at the end of the tail. Hæmal arches are articulated between the vertebral interspaces of most of the caudals. Twelve pairs of ribs directly articulate with the sternum, which consists of ten bones. The modifications of the cranium and the bones of the trunk accord with the descriptions given by Cuvier in his great work the 'Recherches sur les Ossemens Fossiles,' vol. v. part ii.

Mus. Brookes.

2366. The skeleton of the Great Ant-eater (*Myrmecophaga jubata*).

The vertebral formula is:—7 cervical, 15 dorsal, 3 lumbar, 5 sacral, and 29 caudal, but the tip of the tail is incomplete in the present skeleton. The transverse processes of the atlas are pierced in two places obliquely at the fore part of the neural arch on each side. The axis has a transverse perforation on each side the neural arch anterior to the transverse process, which is imperforate. The transverse processes of the three succeeding cervicals are imperforate, the vertebral artery entering the neural canal behind, and perforating obliquely the base of the neurapophysis, anteriorly, as in the *Camelidæ*. In the sixth cervical, the canal for the vertebral artery runs through the base of the transverse process. These processes are much extended antero-posteriorly in all the cervicals and overlap each other. The diapophysial and pleurapophysial portions are very distinct in the fifth and sixth cervicals. The spines of the third and sixth cervicals inclusive are triangular and pointed; that of the seventh is longer than the rest and truncate above; it is much exceeded in antero-posterior diameter by the spine of the first dorsal, but not in height. A metapophysial tubercle is developed from the outer side of the anterior zygapophysis in all the five posterior cervicals. It is placed more outwardly in the first and second dorsals, and gets upon the top of the diapophyses in the succeeding dorsals. In the eleventh dorsal the metapophysis begins to resume its former position, and developes an articular surface from its under part, which joins the upper articulating surface of the anapophysis of the preceding vertebra. In the thirteenth dorsal, the metapophysis is half-way between the diapophysis and anterior zygapophysis, and repeats the same articulation with the anapophysis. In the last two dorsal vertebræ, the base of the metapophysis developes a second articular surface from its inner side, which joins

a new or accessory articular surface on the outside of the posterior zygapophysis of the antecedent vertebra. This tenon-and-mortice articulation of the metapophysis with the zygapophysis on the inner side and with the anapophysis on the outer side, is repeated throughout the whole lumbar series. The anapophysis begins to be developed from the anterior dorsal vertebra, and even there presents an articular surface at its under part to join a corresponding surface on a parapophysis developed from the fore and outer part of the neural arch of the succeeding vertebra. In the tenth dorsal a second articular surface is established in the upper part of the anapophyses for the inferior metapophysial one of the succeeding vertebra; here, therefore, the anapophysis begins to be morticed between the parapophysial and metapophysial articular surfaces, which surfaces continue to the antepenultimate lumbar vertebra, from which, forwards, to the eleventh dorsal, there are sixteen joints between each pair of vertebræ, as in the Armadillo. But this complication goes further in the Great Ant-eater, for, in the penultimate lumbar vertebra, a third articular surface is developed from the under and outer part of the anapophysis, which joins an articular surface on the upper and fore part of the diapophysis of the last lumbar; and this vertebra is united in a similarly complex manner with the first sacral vertebra, which would make eighteen synovial joints, in addition to those at the ends of the centrum, but that those between the normal articular processes, or zygapophyses, are now suppressed. The true serial homology of the processes as 'parapophyses,' developed from the fore part of the base of the neural arch to articulate with the under part of the anapophyses, is well illustrated by the vertebræ of the Great Ant-eater, as in the Megatherium, in which the true diapophyses are better developed than in the Armadillos.

Definite terms for those several processes that undergo such remarkable modifications in the great *Edentata* will now be seen to have become indispensable; they could scarcely be rendered intelligible by the ordinary descriptive periphrases. But, by means of single substantive names, all their modifications can be defined, and, by adjectival inflections of those names, the articular surfaces can be distinguished.

The spines of the five sacral vertebræ are united into a continuous bony ridge; the transverse processes of the first join the ilium, those of the last sacral vertebra are much thickened and join the ischium. Hæmal arches are developed beneath the interspaces of most of the caudal vertebræ. Metapophysial tubercles are developed above the anterior zygapophyses as far as these extend, viz. to the nineteenth caudal. The chief peculiarities of the rest of the skeleton of the *Myrmecophaga jubata* have been accurately described and figured by Cuvier in the 'Recherches sur les Ossemens Fossiles,' tom. v. pt. i.

Purchased.

Genus *Bradypus.*

2367. The skeleton of the Ai, or Three-toed Sloth (*Bradypus tridactylus*).

The vertebral formula is:—9 cervical, 16 dorsal, 3 lumbar, 6 sacral, and 11 caudal. The hind parts of the bodies of the second to the sixth cervical are produced backwards and underlap the fore parts of the bodies of the succeeding vertebræ. The transverse process of the atlas is imperforate, but the base of the neural arch is pierced by the vertebral artery anteriorly

and by the cervical nerve posteriorly. The spines of the cervical vertebræ are moderately and more equably developed than in other mammals; that of the dentata being little larger than the rest. The pleurapophysial part of the transverse process of the eighth cervical is more extended antero-posteriorly than in the preceding cervicals, in which respect it resembles that of the sixth cervical vertebra in ordinary quadrupeds. The pleurapophysial part of the transverse process of the ninth cervical is free, and is more extended in the direction of its length, but is very short as compared with the homologous part of the following vertebra. The slender neck and head of this little rib, joining the fore part of its centrum, occasions the perforated character, as in the antecedent cervical vertebra. In the fourth cervical, however, the vertebral artery perforates the right transverse process, but only grooves the left one on its anterior part. The transverse processes of the second and third cervical vertebræ are both imperforate. A short metapophysis is developed from the fore part of the diapophysis of the penultimate dorsal vertebra, increases in size in the last dorsal, and ascends upon the base of the prozygapophysis of the third lumbar vertebra. The anapophysis is also developed from the last dorsal and from the three lumbar vertebræ; it is short, with an articular surface applied to the outer side of the prozygapophysis of the succeeding vertebra. The spinous processes gradually subside in the posterior dorsals and become obsolete in the lumbar vertebræ. The first pair of ribs is anchylosed to the manubrium: nine pairs directly articulate with the sternum, which consists of eight bones; these are compressed, and progressively increase in depth; the hinder ones are divided into a larger posterior and a smaller anterior part, between which are four articular facets on each side for the bifurcated extremities of two of the ossified cartilages. There is a pair of hypapophyses on the fifth, sixth and seventh caudal vertebræ.

The spine of the scapula is unusually short; the acromion of moderate length, but simple and unexpanded at its extremity; the supraspinal fossa is the broadest, and has a large perforation answering to the supraspinal notch. There are small clavicular bones which do not reach the sternum. The bones of the anterior extremity are remarkable for their slenderness and length. The three digits are terminated by very long curved pointed claws, the whole being adapted for firm grasping and climbing. The humerus is imperforate, the radius and ulna distinct, with a wide interosseous space, and allowing free pronation and supination. Six bones are preserved in the carpus, viz. a 'scapho-trapezium,' a 'lunare,' a 'cuneiforme,' a 'pisiforme,' a bone representing trapezoides and magnum, and an unciforme. The three metacarpals are firmly joined together at their base, and are anchylosed to the rudiments of the first and fifth metacarpals, and with the proximal phalanges of the three fully developed toes. The iliac bones are of unusual breadth compared with those of other quadrupeds, and are anchylosed to the sacrum. The ischia and pubes are long and slender, and circumscribe unusually large thyroid and ischial foramina, the latter being completed by the coalescence of the tuberosities of the ischia with the transverse processes of the last two sacral vertebræ. The head of the femur has no impression of a ligamentum teres. The patella is ossified: there is a fabella behind the external condyle. The tibia and fibula are bent in opposite directions, intercepting a very wide interosseous space. The anchylosis of their two extremities which has been found in older specimens has not taken place here. The inner malleolus projects backwards and supports a grooved process. The outer malleolus projects down-

wards, and fits, like a pivot, into a socket in the astragalus. The calcaneum is remarkably long and compressed. The scaphoid, cuboid, and cuneiform bones have become confluent with each other and the metatarsals, of which the first and fifth exist only in rudiment. The other three have likewise coalesced with the proximal phalanges of the toes which they support.

Presented by Samuel Stutchbury, Esq.

2368. The skeleton of a young Three-toed Sloth (*Bradypus tridactylus*).

The small pleurapophyses of the eighth and ninth cervical vertebræ have been removed. Only fifteen pairs of dorsal pleurapophyses are preserved, leaving four lumbar vertebræ *. There are thirteen false vertebræ, three of which articulate with the ilium, and the fifth and sixth with the tuberosity of the ischium. The distal epiphysis of the ulna has not begun to be ossified.

Mus. Brookes.

2369. The skull of a young *Bradypus tridactylus.*

The interparietal has coalesced with the superoccipital, but the exoccipitals continue distinct both from the superoccipital and basioccipital. The cranium is chiefly remarkable for the size, shape, and connexions of the malar bone, which is freely suspended by its anterior attachment to the maxillary and frontal, and bifurcates behind; one division extending downwards, outside the lower jaw, the other ascending above the free termination of the zygomatic process of the squamosal. The premaxillary bone is single and edentulous, being represented only by its palatal portion completing the maxillary arch, but not sending any processes upwards to the nasals.

Hunterian.

2370. The skull of a *Bradypus tridactylus,* vertically bisected, with the teeth of the left side of the upper and lower jaw separately displayed.

There is no bony tentorium: the two divisions of the meatus internus commence separately upon the exterior of the petrosal, which is not impressed by a cerebellar fossa. The depression receiving the natiform protuberance of the cerebellum is formed chiefly by the squamosal. The walls of the rhinencephalic fossa are entirely surrounded by the olfactory chamber, which extends above into the frontal and beneath into the sphenoidal sinuses. A well-marked vascular foramen leads downwards from the partition between the rhinencephalic and prosencephalic chambers. The rough exterior part of the petrosal forms, as it were, the border of a capsule to the tympanic: the fossa for the stylohyal is well marked at the back part of the border. The pterygoid forms a large quadrate vertical plate. The bony septum

* M. de Blainville, in noticing a similar discrepancy in the number of the dorsal vertebræ in a Sloth dissected by Dr. Harlan, as compared with those observed by Cuvier, does not state whether it was compensated by a proportional difference in the number of the lumbar vertebræ.

narium terminates half-way from the external nostril. Two turbinals are attached to the maxillary wall of the olfactory chamber, but the ethmo-turbinal is the least extensive, and consists of a series of subvertical curved laminæ of bone descending and radiating from the inferior surface of the floor of the rhinencephalic chamber. There is a small lacrymal bone wedged in between the frontal, maxillary, and malar, but no lacrymal perforation, nor is there any antorbital foramen.

Mus. Langstaff.

The following are parts of the skeleton of the same *Bradypus tridactylus*:—

Mus. Langstaff.

2371. The nine cervical vertebræ.

The pleurapophysis of the eighth cervical is anchylosed, completing the arterial foramen, as in the seventh vertebra. If the diapophysis of the ninth vertebra supported the rudiment f a rib, it has not been preserved.

2372. The pelvis and caudal vertebræ.

Neither the vertebræ of the sacrum, nor the elements of the os innominatum, have coalesced.

2373. The right scapula, with the detached coracoid contributed to the anterior apex of the glenoid cavity.

2374. The right humerus.

2375. The right radius, ulna, and bones of the fore-foot.

The epiphyses of the long bones are not yet anchylosed to the shafts, nor are the proximal phalanges of the three middle digits anchylosed to the metacarpals, of which they seem to be the distal epiphyses.

2376. The right femur.

2377. The right tibia and fibula, with the bones of the right hind foot.

Mus. Langstaff.

The following preparations are from the bones of a Three-toed Sloth (*Bradypus tridactylus*):—

Presented by Capt. Sir Everard Home, Bart., F.R.S.

2378. The right humerus, longitudinally bisected, showing the shaft almost wholly occupied by a fine cancellous structure: the epiphysial sutures are not yet obliterated.

2379. The right ulna, longitudinally bisected, showing the absence of a medullary cavity: the distal epiphysis is long and is still ununited.

2380. The right radius, longitudinally bisected, showing the absence of a medullary cavity, and the epiphysial sutures at both extremities.

2381. The carpus and metacarpus of the right fore-foot.

The carpus is reduced to six bones, the scaphoid being connate with the trapezium, and the magnum with the trapezoides. A rudiment of the metacarpal of the pollex has coalesced with that of the index, and a rudiment of the metacarpus of the minimus with that of the annularis, but a trace of the original separation remains.

2382. The ungual phalanges and the claws of the same fore-foot.

2383. The right tibia, longitudinally bisected, showing the rudiment of a medullary cavity, towards which the minute arterial canal is directed. The epiphyses are still ununited at both ends of the bone.

2384. The right fibula, longitudinally bisected, showing the absence of a medullary cavity, and the large size of the lower epiphysis.

2385. The tarsus and metatarsus of the left hind-foot.

The ento- and meso-cuneiform bones, the rudimental metatarsal of the hallux, and the metatarsal of the second toe are confluent into one bone: the rudimental metatarsal of the fifth toe has not become united with that of the fourth toe.

2386. The ungual phalanges and claws of the same hind-foot.

2387. The skeleton of the Two-toed Sloth (*Cholœpus didactylus*).

The vertebral formula is:—7 cervical, 23 dorsal, 3 lumbar, 8 sacral, 4 caudal. The clavicles are entire: the large coracoid is still ununited with the scapula: the humerus is perforated above the inner condyle. The functional digits of the fore-foot are reduced, as in the Ruminants, to the third and fourth, with a rudiment of the metatarsal of the second and of the fifth toes. The skeleton is of a young animal. The elements of the occipital bone are still ununited. The tympanic cells extend into the base of the zygomatic process, which terminates freely forwards and does not join the broad bifurcate malar. The lacrymal is pierced

external to the orbit. The mandible is pierced by an oblong fissure outside the last molar tooth. In the hind-foot the second, third and fourth toes are functional, with rudiments of the metatarsals of the first and fifth.

In this genus the first tooth above, and the first below, which is behind it, are developed to the forms and proportions of canines.

Prepared from a specimen presented by the Zoological Society of London.

Order INSECTIVORA.

Family *Erinaceidæ* (Hedgehogs and Tenrecs).

Genus *Erinaceus*.

Dental formula:—$i\,\frac{3-3}{3-3}$, $p\,\frac{4-4}{2-2}$, $m\,\frac{3-3}{3-3}=36$.

2388. The skeleton of a Hedgehog (*Erinaceus europæus*).

The vertebral formula is:—7 cervical, 15 dorsal, 6 lumbar, 3 sacral, and 14 caudal. The transverse processes of the last cervical are not perforated. All the processes are small throughout the vertebral column, and offer no impediment to the free inflection of the spine. The humerus is perforated between the condyles. The fibula coalesces with the tibia at its distal end. The feet are plantigrade.

Mus. Brookes.

2389. The skeleton of a Hedgehog (*Erinaceus europæus*).

The vertebral formula is the same as in the preceding skeleton.

Mus. South.

2390. The head and trunk of a Hedgehog (*Erinaceus europæus*).

The vertebral formula is:—7 cervical, 15 dorsal, 5 lumbar, 4 sacral, and 11 caudal.

Hunterian.

2391. The skeleton of a Hedgehog (*Erinaceus europæus*), vertically bisected.

The cranial cavity so exposed shows the rhinencephalic compartment to be nearly equal in size with the epencephalic one: the petrosal is impressed by a cerebellar fossa. The nasal passage terminates behind in a hemispheric excavation of the basisphenoid; and this bone expands outwardly to form the floor of the tympanic cavity. The neural canal is widest in the cervical region, contracts towards the middle of the back, and expands a little in the

loins. Seven pairs of ribs directly join the sternum, which consists of four bones. The cancellous structure of the divided parts of the vertebræ is light and open.

Presented by Prof. Owen, F.R.S.

2392. The skull of a Hedgehog (*Erinaceus europæus*).

The squamosal is traversed by a vertical venous canal.

Presented by Henry Cline, Esq.

2393. The skull, wanting the lower jaw, of a Hedgehog (*Erinaceus europæus*).

There are two oblong vacuities in the palatal bones. The malar is applied, like a splint, along the outer and under side of the junction of the zygomatic with the maxillary.

Mus. Brit.

2394. A portion of the cranium of a Hedgehog (*Erinaceus europæus*).

It includes the basisphenoid, alisphenoids, petrosals, tympanics, squamosals, and the right half of the hyoidean arch, besides the palatine and pterygoid bones; and belonging to the same skull, but detached, are the orbitosphenoids, presphenoid and vomer, the prefrontal, nasal and turbinal bones.

Hunterian.

2395. The bones of the left fore-arm and fore-foot of a Hedgehog (*Erinaceus europæus*).

The carpus consists of a scapho-lunar bone, cuneiforme and large pisiforme, trapezium, trapezoides, magnum and unciforme. A sesamoid is attached to the outside of the base of the metacarpal of the digitus minimus.

Hunterian.

2396. The bones of the left hind-foot of the same European Hedgehog.

The ecto-cuneiforme and cuboides are elongated.

Hunterian.

Genus *Gymnurus*.

Dental formula:—$i\,\frac{3-3}{3-3},\ c\,\frac{1-1}{1-1},\ p\,\frac{4-4}{4-4},\ m\,\frac{3-3}{3-3}=44.$

2397. The cranium of the Sumatran Gymnure (*Gymnurus Rafflesii*).

The canines of the upper jaw have each two roots. The bony palate is entire. The premaxillaries join the anterior half of the nasals. The lacrymal perforation is in a small fossa at the fore part of the orbit, which is not defined from the temporal fossa. The zygomatic process of the squamosal is long and slender, joining that of the maxillary, but not strength-

ened by a malar bone, as it is in the Hedgehog. The squamosal is traversed by a vertical venous canal, through which a bristle is passed on the right side. The alisphenoid is pierced lengthwise by an ecto-carotid canal. The basisphenoid expands to form the floor of the tympanic cavity. The superoccipital and parietal crests are well developed.

Presented by Sir Stamford Raffles, P.Z.S.

Family *Soricidæ* (Shrews).

Genus *Amphisorex.*

Dental formula:—$i\,\frac{3-3}{3-3}$, $p\,\frac{4-4}{4-4}$, $m\,\frac{3-3}{3-3}=40$.

2398. The skeleton of a Shrew (*Amphisorex rusticus*).

There is no malar bone, nor any zygomatic processes of the squamosal or maxillary. The radius and ulna are closely united, and the fibula appears as a slender process ascending from the middle of the tibia.

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 3 sacral, and 15 caudal.

Purchased.

Genus *Hydrosorex.*

2399. The skull of the Black or Water Shrew (*Hydrosorex fodiens*). *Hunterian.*

Genus *Myogalea.*

2400. The skull of the Desman or Musk Shrew (*Myogalea moschata*). *Hunterian.*

Family *Talpidæ* (Moles).

Genus *Chrysochloris.*

Dental formula:—$i\,\frac{3-3}{3-3}$, $p\,\frac{1-1}{2-2}$, $m\,\frac{6-6}{5-5}=40$*.

2401. The skull of the Cape Mole or Chrysochlore (*Chrysochloris capensis*).

The cranium is remarkable for its resemblance to that of a bird, not only in its thin smooth

* The premolars and molars are here determined by their shape, not by their mode of development, which is unknown.

convex walls, but in its great transverse and vertical diameters, and its allocation at the back part of the skull. The zygomatic arch is complete: the base of the zygomatic process is deeply excavated anteriorly.

Hunterian.

Genus *Talpa.*

2402. The skeleton of the common Mole (*Talpa europæa*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 5 sacral, and 10 caudal.

Presented by Henry Cline, Esq.

2403. The skeleton of the common Mole (*Talpa europæa*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 5 sacral: some of the caudals are wanting.

Presented by Thomas Bull, Esq.

2404. The skeleton of the common Mole (*Talpa europæa*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 5 sacral: the caudal vertebræ are wanting.

Mus. South.

2405. The skull of the common Mole (*Talpa europæa*). *Hunterian.*

2406. The mutilated skull of the common Mole, with the left ramus of the lower jaw, and the teeth of the left side of the upper and right side of the lower jaw, exposed. The upper canines have each two fangs. *Hunterian.*

The following are parts of the same skeleton of the Common Mole (*Talpa europæa*):—

Hunterian.

2407. The cranium, longitudinally bisected.

It shows the remarkable extension of the superoccipital upon the upper surface of the cranium, the expanded mastoids, and the very slender zygomata in which no distinct malar bones can be discerned. The petrosal is largely and deeply excavated by the cerebellar fossa. The rhinencephalic fossa is large and well defined. The basioccipital and basisphenoid are thick and of a fine spongy texture.

2408. The dentata and other cervical vertebræ.

The odontoid process has a sharp hypapophysis: the spine of the dentata is large and extended back over the third vertebra: the neural arches of this and the succeeding vertebræ form thin simple arches, without spines; the transverse processes of the fourth, fifth and

sixth cervicals are produced forwards and backwards, and overlap each other: in the seventh those processes are reduced to tubercular diapophyses which are not perforated: the bodies of the vertebræ are depressed and quadrate.

2409. The thirteen dorsal vertebræ complete, *i. e.* with their ribs and the sternum.

The first sternal bone, or manubrium, is of unusual length, being much produced forwards, and its under surface downwards in the shape of a deep keel for extending the origin of the pectoral muscles. Seven pairs of ribs directly join the sternum, which consists of four bones, in addition to the manubrium and an ossified ensiform appendage. The neural spines, which are almost obsolete in the first eight dorsals, rapidly gain length in the rest, and are antroverted in the last two dorsal vertebræ. The diapophyses, being developed in the posterior dorsals, determine the nature of the longer homologous processes in the lumbar vertebræ, part of which series is here retained in connection with the dorsal series.

2410. The five other lumbar vertebræ.

The neural spines are low, but of considerable antero-posterior extent: the transverse processes are bent forward in the last four vertebræ: a small, detached, wedge-shaped hypapophysis is fixed into the lower interspace of the bodies of the vertebræ.

2411. The pelvis and most of the caudal vertebræ.

The ossa innominata have coalesced with the sacrum, but not with each other, the pubic arch remaining open. The bodies of the sacral vertebræ are blended together and are carinate below: their neural spines have coalesced to form a high ridge. The acetabula look almost directly outwards.

2412. The bones of the right fore-arm and hand.

The olecranon expands transversely at its extremity, and the back part of the ulna is produced into a strong ridge of bone. The sabre-shaped accessory ossicle is preserved at the radial side of the carpus. The ungual phalanges are bifid.

2413. The bones of the left fore-arm and foot.

2414. The bones of the right hind extremity.

The head of the femur has no pit for a round ligament. A fabella is preserved behind the outer condyle. A hamular process is sent off from the head of the tibia and fibula; the lower moieties of the shafts of these bones are blended together.

2415. The bones of the left hind extremity.

Order CHEIROPTERA.

Family *Insectivora*.

Genus *Vespertilio*.

Dental formula :—$i\,\frac{2-2}{3-3},\ c\,\frac{1-1}{1-1},\ p\,\frac{3-3}{3-3},\ m\,\frac{3-3}{3-3}=38.$

2416. The skeleton of the common Bat (*Vespertilio murinus*).

The vertebral formula is :—7 cervical, 12 dorsal, 7 lumbar, 3 sacral, and there are 8 caudal vertebræ, but the end of the tail is imperfect. The chief characteristics of the skeleton in this volant mammal are :—the gradual diminution of size of the spinal column from the cervical to the sacral regions: the absence of neural spines: a keeled sternum: long and strong bent clavicles: broad scapulæ: elongated humeri: still more elongated and slender radius and metacarpals and phalanges of the four fingers, which are without claws, the thumb being short and provided with a claw: the pelvis small, slender, and open at the pubis: the fibula absent, like the ulna in the fore-arm: and a long and slender styliform appendage to the heel, which helps to sustain the caudo-femoral membrane.

Presented by W. H. Clift, Esq.

Genus *Pteropus*.

Dental formula :—$i\,\frac{2-2}{2-2},\ c\,\frac{1-1}{1-1},\ p\,\frac{1-1}{3-3},\ m\,\frac{3-3}{3-3}=32.$

2417. The skeleton of a large frugivorous Bat (*Pteropus*).

The vertebral formula is :—7 cervical, 14 dorsal, 4 lumbar and 6 sacral. The keel of the large manubrium sterni is produced into a process at each angle; the three succeeding sternal bones are carinate: seven pairs of ribs directly join the sternum. The clavicles are long, arched, and very powerful. The ulna is slender, and terminates in a point at the lower third of the radius: the olecranon is a detached sesamoid ossicle. The index has a claw as well as the pollex: the ungual phalanx is wanting in the other three digits, in which the second phalanx is long, slender, and terminates in a point. The pelvis is here widely open at the pubis. The fibula is in the form of a slender style ascending from the outer malleolus and terminating in a point.

Presented by Dr. Henderson.

2418. The skull of a *Pteropus*.

The squamosal is perforated by a venous canal which opens below behind the root of the zygoma. The orbit is partly defined behind by long and slender postfrontal processes. The lacrymal is perforated external to the orbit.

Hunterian.

2419. The skull of a *Pteropus.*

The premaxillary bones are here preserved. The sutures are obliterated on the smooth convex cranium.

Hunterian.

2420. The skull of a *Pteropus.* *Presented by Sir Everard Home, Bart., V.P.R.S.*

2421. The cranium of a *Pteropus,* longitudinally bisected.

The rhinencephalic fossa is large and well defined. The petrosal shows a deep cerebellar fossa, overarched by the vertical semicircular canal.

Presented by Prof. Owen, F.R.S.

2422. The lower jaw of a large *Pteropus.*

The condyles are convex and transversely extended: the coronoid processes are high and broad: the angles of the jaw are slightly produced and rounded off.

Hunterian.

2423. Three ribs of a *Pteropus,* which are partially blended together by ossification of the interosseous substances. *Hunterian.*

2424. The lumbar vertebræ, pelvis, and femora of a *Pteropus.*

The ischia are confluent at their tuberosities, to which the end of the sacrum is united. The symphysis pubis is obliterated by bony union: the spine of the pubis is strongly developed. The acetabula are directed upwards and backwards, to which the head of the femur is attached by a ligamentum teres. The two trochanters are nearly equally developed, and are opposite each other.

Hunterian.

2425. The scapula and clavicle of a *Pteropus.* The scapula is long and narrow: the coracoid is of unusual length. *Hunterian.*

2426. The bones of the wing, or anterior extremity of a *Pteropus,* with the interdigital membranes dried and preserved. *Hunterian.*

2427. The humerus of a large *Pteropus.* *Hunterian.*

2428. The radius and rudimental ulna, with the detached olecranon, of a large *Pteropus.* *Hunterian.*

2429. The distal epiphysis of the radius, with the bones of the hand of a large *Pteropus*.

The middle digit is fifteen inches in length, including the metacarpal bone. The large scapho-lunar bone forms almost the whole of the first row of the carpus, and offers a deep socket for the combined convex heads of the os magnum and unciforme.

Hunterian.

2430. The humerus of a *Pteropus*, longitudinally bisected. The walls are thin and compact; the medullary cavity is large, and filled with the dried remains of an oleaginous marrow. *Hunterian.*

2431. The radius, longitudinally bisected, of a *Pteropus*. It presents the same internal structure as the humerus. *Hunterian.*

Order CETACEA (*Cetacea vera* seu *Carnivora*, Cuv.).

Family *Balænidæ* (Whales).

Genus *Balæna* (True Whales).

2432. The skull of the great Whalebone-Whale (*Balæna mysticetus*, Linn.).

It is remarkable for the enormous proportion of the facial to the cranial part of the skull, and for the length and slenderness of the jaws, of which the upper one is arched vertically, and the rami of the lower jaw are arched horizontally and bend towards each other. Both jaws are edentulous: to the upper are attached in the recent animal the baleen-plates called 'whalebone,' and the lower jaw is expanded to include these and protect the enormous tongue.

Hunterian.

2433. The right ramus of the lower jaw of a smaller or younger *Balæna mysticetus*. *Hunterian.*

2434. The left ramus of the same lower jaw. *Hunterian.*

2435. The anchylosed cervical vertebræ of the great Whalebone-Whale (*Balæna mysticetus*).

The true number of vertebræ here united together is shown by the intervals for the passage of the nerves between the neural arches. This preparation illustrates a marked anatomical

distinction between the whales without a dorsal fin (*Balæna*) and those that have such fin (*Balænoptera*), in which the cervicals do not become anchylosed together. (See No. 2446.)

Hunterian.

2436. The skull of a fœtal Southern Whale (*Balæna australis*, Cuv.).

The plates of whalebone are about 170 on each side of the upper jaw. Each frontal is a transversely elongated slender triangle, with its base at the frontal suture, which is a thick vertical symphysis, and its apex at the superorbital ridge: the inferior angle of the base rests upon the prefrontals and upon the sides of the expanded base of the vomer. The frontals take a very small share in the formation of the cerebral cavity. Their cranial surface forms a very small concavity at the back part of the base: a half-canal is continued forwards from the lower angle of this surface into the nasal cavity. Almost the whole of the upper and outer surface of the frontals is overlapped by the parietals and occipitals, leaving a very narrow exposed transverse strip across the upper part of the skull. The anterior border of each frontal is joined mesially with the nasal, next with the upper end of the premaxillary, and for the rest of its extent with the maxillary bone, which is continued outwards to form the antorbital process.

Purchased.

2437. The cervical vertebræ of the same fœtal Whale (*Balæna australis*).

The neurapophyses of one side are disunited above from those of the other side, as they are from the centrum below: a compressed diapophysis is sent off from the outer side of each; it is shortest and thickest in the atlas. The third and fourth neurapophyses have coalesced at their upper part on the left side, and those of the last five vertebræ have coalesced on the right side. The cortical portion of the centrum of the atlas is ossified, and forms a wedge-shaped piece of bone, like the corresponding part in the Ichthyosaurus. The centrums of all the cervical vertebræ have already coalesced by continuous ossification.

Purchased.

2438. The petrotympanic bones of the Southern Whale (*Balæna australis*).

Presented by George Bennett, Esq., F.Z.S.

2439. The right petrotympanic bone of the Southern Whale (*Balæna australis*).

Presented by J. Babington, Esq.

2440. The opposing epiphyses of the centrums of two vertebræ of a young Whale (*Balæna*), with their intervening intervertebral substance. *Hunterian.*

2441. One of the epiphyses, with an attached intervertebral cushion, of the centrum of a vertebra of a larger Whale (*Balæna*).

This embryonic condition is not obliterated at any age in these gigantic aquatic Mammals, which, being sustained in a medium of nearly their own specific gravity, have more need of flexibility than of firmness in the vertebral column. As the same conditions influenced the

most ancient members of the genus, such detached epiphyses are found fossil, and have been mistaken for a circular flat kind of shell.

Presented by Prof. Owen, F.R.S.

2442. A blade of baleen or 'whalebone' of the *Balæna mysticetus*. It measures 11 feet 9 inches in length. *Hunterian.*

2443. A blade of baleen of the *Balæna mysticetus*.

(See the Gallery Preparations, Nos. 319—323, for an illustration of the nature, formation and uses of this peculiar substance.)

Hunterian.

Genus *Balænoptera* (Finner Whales).

2444. Skeleton of a young Piked Whale (*Balæna rostrata*, Fabricius and Hunter).

It is of the individual dissected by Hunter, and alluded to in the paragraph of his paper 'On Whales,' in which he says, "Of the *Balæna rostrata* of Fabricius I had one 17 feet long *."

In the present skeleton forty-four vertebræ are preserved, of which seven are cervical, eleven dorsal, and the rest lumbo-caudal, but wanting the terminal depressed vertebræ. Eleven pairs of ribs are preserved, but not the sternum, nor the hyoid arch, nor the rudimental ischia. The hæmal arches are attached beneath the twelfth and some of the succeeding vertebræ of the lumbo-caudal series. The cervicals are extremely short or compressed in the direction of their axis, but are not anchylosed, with the exception of the first and seventh: their transverse processes are widely perforated or notched, according as the inferior (pleurapophysial) portion joins, or not, the superior (diapophysial) part: in the seventh vertebra this part only is developed: it is longer in the first dorsal, and the diapophyses increase both in length and strength in the succeeding dorsals and support the pleurapophyses or vertebral ribs. The articular ends of the centrum still retain their primitive condition of epiphyses in most of the vertebræ of this skeleton.

Hunterian.

2445. The anterior extremity of the upper jaw of a young Piked Whale (*Balæna rostrata*); showing the arrangement of the broad and short triangular baleen plates in a single series along each margin of the palate, set at right angles to its long axis: the plates are fringed along their inner border, and slightly bent transversely with the convexity forwards. *Hunterian.*

* Animal Œconomy, 8vo, ed. 1837, p. 332. tab. xlviii.

2446. The atlas of the large Finner Whale (*Balænoptera Boops*).

This specimen shows that the atlas does not become anchylosed to the axis in mature and large individuals of the present species of Finner Whale. The transverse processes are short, simple, obtuse and imperforate: the vertebral arteries have merely pierced the neural arch.

Hunterian.

Family *Physeteridæ* (Cachalots or Sperm-Whales).

Genus *Physeter*.

2447. The skull of a fœtal Cachalot (*Physeter macrocephalus*, Linn.).

The condition of the bones in this rare and instructive specimen permits the following observations being made on the cranial organization of the present genus of Cetaceous animal.

The bony elements of the occipital neural arch are still unanchylosed. The lateral margins of the anterior half of the basioccipital are produced and bent obliquely downwards. The exoccipitals are much produced and expanded laterally: they are deeply notched below. The superoccipital contributes the upper ends of both condyles; it is in the form of a vertical plate, convex from side to side; a strong internal vertical crest is produced forwards: the superoccipital is overlapped at its lower and lateral angles by the exoccipitals, anterior to which it attains to the alisphenoids, and is notched externally for the reception of the upper angle of the squamosals. There are no distinct parietals nor mastoids: the parietal might be a thin plate partly detached and partly anchylosed to the upper broad margin of the superoccipital: the lower angles of this plate, incompletely separated by a fissure, may represent either the lower angles of the parietals or the mastoids; these chiefly support the squamosals. The basisphenoid, a thick hexagonal bone, concave from side to side below, nearly flat above, is anchylosed to the alisphenoids: it is perforated or grooved by the entocarotids, but has no clinoid processes nor sella turcica. The alisphenoids, perforated near the middle of their base by the foramina ovalia and rotunda, have a thick quadrate plate on their inner side, forming their cranial surface: they extend into a point anteriorly, and articulate with both the frontal and with the parietal angle of the superoccipital. The squamosals enter a groove of the superoccipital posteriorly, and receive the alisphenoid in a groove anteriorly. The presphenoid and the anchylosed orbitosphenoids form the anterior wall of the cranial cavity, and are perforated by the optic foramina: they articulate anteriorly with the frontals, sending up a small process into the interspace at the beginning of the frontal suture, which process is impressed by a blind fossa like a small foramen olfactorium on each of its sides: the presphenoid unites with the basisphenoid: the posterior and lateral parts of the orbitosphenoids unite with the great alæ: the whole of the under and anterior part is overlapped by the vomer. There is no cribriform plate. The frontal bones are large triangular plates, concave externally, with the outer and fore angle produced into a long superorbital process, the channel on the under part of which contracts as it approaches the cranium into a long,

deep and narrow groove, which lodged the muscles of the eye-ball. The median anterior part of the bone unites with both orbitosphenoids and alisphenoids, and external to this is the broad sutural surface for the squamosal. The straight median margins of the frontals are thinned off and joined by a squamous frontal suture, the right overlapping the left. The whole posterior and lateral border of the frontal, as far as the junction with the squamosal, presents a broad, oblique, sutural surface, which joins, by overlapping, the contiguous border of the occipital. The smooth cerebral surface of the frontals is flat at the middle, arched at the sides, and not impressed by any convolutions. The vomer expands into two aliform processes at its base, which is applied against the presphenoid and orbitosphenoids; it then becomes subcompressed and smoothly excavated, but much more deeply at the left side, where it forms the inner and posterior boundary of the single nasal meatus: it again slightly expands, and afterwards is continued, gradually decreasing, to near the anterior end of the premaxillaries. There is no trace of nasal bones. The bone, formed by the coalesced prefrontals, penetrates the posterior part of the groove of the vomer, above which it expands, unequally, into an obtuse prominence rising and inclining to the left side: it is grooved on both sides, and forms the septum of the vertical nasal passage.

The palatine and pterygoid bones articulate with the sides of the expanded base of the vomer: the margins of the canal excavated in the upper surface of the rostral production of the vomer are overlapped by the premaxillaries.

The palatal is a small, triangular bone, thickest anteriorly, thin, produced and bent posteriorly and above: it commences here by its attachment to the anterior and outer angle of the vomer, bends forwards, downwards and inwards to circumscribe the nasal meatus, and receives in a groove on its upper and anterior border the palatine prominence of the upper maxillary bone. The whole posterior border of the palatine fits into a groove of the contiguous border of the pterygoid. The pterygoid, which is double the size of the palatine *, extends backwards to the basioccipital, articulating in its progress by its expanded upper border with the pre-, basi- and ali-sphenoids: from this border the bone descends, arching inwards towards its fellow, which it joins along the anterior half of its extent: the remaining free border is divided from this by a deep notch, and circumscribes the large posterior bony aperture of the nostril.

The maxillary expands from its palatine prominence—the essential point of its suspension —backwards, outwards, but chiefly forwards, where it gradually diminishes to an obtuse point. It contracts an union posteriorly with the orbitosphenoid and alisphenoid, and very extensively with the frontal. The malar bone is wedged into the outer interspace, between the maxillary bone and the orbital process of the frontal. The nasal process of the maxillary is traversed by a large vertical canal. The premaxillaries are applied against the whole inner surface of the maxillaries between them and the vomer. The right extends much farther back than the left. The capacious basin on the upper surface of the skull, which lodges the valuable product called 'spermaceti,' is formed by the expanded and concave nasal processes of the premaxillaries and maxillaries, which overlap the frontals: a stout ridge divides the

* All the primary, central and essential bones of this cranium are small: development and expansion have had their influence chiefly in the subsidiary and peripheral pieces.

inner concave from the outer sloping surface of this part of the maxillary. The malar bone is a moderately long and slender piece, bent upon itself at an acute angle, like the scapulo-coracoid in Birds. The upper portion, wedged between the maxillary and frontal, is the thickest: the lower and more slender branch is bent downwards and backwards, circumscribing the orbit anteriorly and below, and continued by ligament or fibro-cartilage to the short obtuse zygomatic process of the temporal. There are no lacrymal bones. The anterior two-thirds of the middle and under surface of the maxillary is traversed by a vascular and dental groove: rudiments of teeth hidden and buried in the gum are usually found in this groove. The squamosal is a comparatively small, but strong and thick triangular bone: the upper angle represents the expanded squamous part in land mammals, and is articulated by broad dentated sutural margins to the frontal and exoccipital: its anterior border is grooved for the reception of the alisphenoid: the lower angle is, as it were, truncated, and presents a rough surface for the attachment of the petrotympanic: a short obtuse anterior angle bends forwards and represents the zygomatic bone: the under surface presents a smooth shallow cavity for the condyle of the lower jaw; the inner border of the glenoid surface being produced downwards into a slender styliform process. The condyle of the mandible projects from the posterior part of the base or ascending ramus, which is compressed and produced into a low obtuse coronoid process above, and into a similar angle below: a wide excavation beginning, on the inner side of the ascending ramus, deepens and contracts into the dental canal, which enters the substance of the horizontal ramus: a fissure is continued along the inner side of the ramus from this canal, and is the sole indication of a compound structure of the jaw. The vessels and nerves emerge from several foramina at the outer side of the ramus, where it is attached by its long symphysis to its fellow: the upper border of the symphysial part of the ramus is excavated by a continuous dental canal or groove, now somewhat resembling that in the upper jaw. The length of the symphysis in the present skull of the fœtal Cachalot is three-fourths that of the rest of the ramus. In the adult male the disproportionate growth of this part of the jaw leads to an excess of length of the symphysial part beyond the rest of the ramus.

Purchased.

2448. The two rami of the lower jaw, wanting the teeth, of a Cachalot (*Physeter macrocephalus*). *Hunterian.*

2449. The rami of the lower jaw, with the teeth, of a male Cachalot (*Physeter macrocephalus*).

The symphysis of the jaw is coextensive with the dental series, which consists, in each ramus, of twenty-seven teeth, conical or ovoid, according to their state of development and usage: the smallest teeth are at the two extremes of the series. In the young Cachalot they are conical and pointed, but become obtuse by use, whilst progressive growth expands and elongates the base into a fang, which then contracts, and is finally solidified and terminated obtusely. The teeth are separated by intervals as broad as themselves. In respect to their mode of implantation they offer a condition intermediate between that of the teeth of the

extinct Ichthyosaurus and the Grampus, being lodged in a wide and moderately deep groove, imperfectly divided into sockets, the septa of which reach only about half-way from the bottom of the groove.

Mus. Brookes.

2450. The lower jaw of a female Cachalot (*Physeter macrocephalus*).

Each ramus contains twenty-two teeth: the lower jaw also shows a sexual distinction of size, being shorter by one-third than in the male.

Presented by Fred. D. Bennett, Esq., F.L.S.

2451. The dentary portion of the lower jaw of a *Physeter*, said to be of the 'lesser Cachalot' (*Physeter catodon*), probably of a young *Physeter macrocephalus*. No characters in support of the specific distinction can be founded on the present specimen from the teeth, for most of them have belonged to large species of Seal, and have been artificially attached to the alveolar grooves.

Mus. Brookes.

2452. The right ramus of the lower jaw of a *Physeter*, the anterior part of which is curved strongly inwards and backwards, in consequence of some injury received in youth. *Presented by Fred. D. Bennett, Esq., F.L.S.*

2453. A portion of the lower jaw of a *Physeter*, being a section of its entire thickness, exhibiting its dense osseous structure, and its wide vascular and nervous canal. *Presented by Fred. D. Bennett, Esq., F.L.S.*

2454. The right petrotympanic bone of a Cachalot (*Physeter macrocephalus*). It is fractured so as to display the inner surface of the convoluted tympanic bone.

Presented by George Bennett, Esq., F.L.S.

2455. The left petrotympanic of the same Cachalot.

Presented by George Bennett, Esq., F.L.S.

2456. A lumbar vertebra of a large Sperm-Whale (*Physeter macrocephalus*).

Presented by Sir William Blizard, F.R.S.

2457. A caudal vertebra of a large Sperm-Whale (*Physeter macrocephalus*).

Presented by Sir William Blizard, F.R.S.

2458. A caudal vertebra of the same *Physeter*.

Presented by Sir William Blizard, F.R.S.

2459. Two ribs of the Cachalot (*Physeter macrocephalus*).

Presented by Sir Anthony Carlisle, F.R.S.

2460. The left pelvic bone (ischium) of a Cachalot (*Physeter macrocephalus*).

Presented by the Very Rev. Dr. Buckland, F.R.S.

2461. A tooth of the Cachalot (*Physeter macrocephalus*), the crown of which has been removed by a transverse section. *Hunterian.*

2462. One moiety of a vertically bisected tooth of a Cachalot (*Physeter macrocephalus*). The cut surface has been polished. *Hunterian.*

2463. One moiety of a vertically bisected tooth of a Cachalot (*Physeter macrocephalus*). *Hunterian.*

2464. A tooth of the Cachalot (*Physeter macrocephalus*). *Mus. Brit.*

2465. A tooth of the Cachalot (*Physeter macrocephalus*), vertically bisected, and the cut surfaces of one moiety polished.

These sections show the teeth of the Cachalot to consist of a hollow cone of dentine, thickly coated by cement, and more or less filled by the ossified pulp. The cement is thickest at the junction of the crown and base, which are not divided by a neck. The laminated appearance of the dentine on the polished surface of these sections is due to a microscopic structure described in Owen's 'Odontography,' vol. i. pp. 355–357.

Presented by Sir Everard Home, Bart., V.P.R.S.

2466. A tooth of the Cachalot (*Physeter macrocephalus*). *Hunterian.*

2467. A tooth of the Cachalot (*Physeter macrocephalus*). *Hunterian.*

2468. A tooth of the Cachalot (*Physeter macrocephalus*). *Mus. Brit.*

2469. A tooth of the Cachalot (*Physeter macrocephalus*). *Mus. Brit.*

2470. A tooth of the Cachalot (*Physeter macrocephalus*). *Purchased.*

2471. Two teeth of the Cachalot (*Physeter macrocephalus*).
Presented by Okey Belfour, Esq.

2472. A tooth of a Cachalot, ascribed in the former Catalogue (4to, 1831) to the High-finned species (*Physeter Tursio*, Gmel.). It appears to be a worn specimen of tooth from the lower jaw of the *Physeter macrocephalus.*
Mus. Brit.

2473. A tray of similar teeth, ascribed to the *Physeter Tursio.* *Mus. Brit.*

2474. A tooth of a Cachalot, ascribed in the former Catalogue (4to, 1831) to the *Physeter catodon*, Gmel. It appears to be a young or terminal tooth of the *Physeter macrocephalus.* *Mus. Brit.*

2475. A tray containing six similar teeth, ascribed to the *Physeter catodon*, Gmel.
Hunterian.

2476. A tooth from the upper jaw of a female Cachalot (*Physeter macrocephalus*).

It is curved in the form of a semicircle, obtusely pointed at both ends, one of which is polished on the convex side, probably by abrasion against the larger teeth of the lower jaw: the root of the present tooth was buried in the thick callous gum covering the alveolar borders of the upper jaw.

Presented by Fred. D. Bennett, Esq., F.L.S.

2477. A tooth, longitudinally bisected, from the upper jaw of a female Cachalot (*Physeter macrocephalus*).

"In two mature Cachalots which Mr. Bennett examined, he found eight of these teeth on each side of the upper jaw."—Odontography, p. 354.

Presented by Fred. D. Bennett, Esq., F.L.S.

2478. Two stalactitic masses of osteodentine, found loose in the sockets of the lower jaw of the Cachalot (*Physeter macrocephalus*). They are formed by irregular ossifications of the remnants of the dentinal pulp after the formation of the ordinary body of the tooth. *Presented by George Bennett, Esq., F.L.S.*

Genus *Hyperoodon.*

2479. The skeleton of the Bident Dolphin, or Bottle-nosed Whale (*Hyperoodon bidens*).

The cervical vertebræ have coalesced with one another: beyond these there are thirty-eight free vertebræ, of which only the nine anterior bear moveable ribs: the twenty-second vertebra first bears hæmapophyses attached to the under part of the centrum. The five anterior pairs of ribs articulate with the sternum, which consists of three bones. The cranium is remarkable for the development of the lateral border of each maxillary bone into a broad and lofty vertical crest; and for the backward prolongation of the posterior border of the same bones to the occipital region, where it is developed into what seems to be an occipital crest. This animal was taken in the Thames, near London Bridge, in the year 1783, and is described and figured by John Hunter, in the 'Philosophical Transactions' for the year 1787, pl. xix. It was considered by him to be of the same species as that of which a female was caught at Malden, in Essex, and described by Dale in his 'History of Harwich,' 1730, 4to, p. 411.

Hunterian.

2480. The anterior united portion of the lower jaw of an immature Bident Dolphin (*Hyperoodon bidens*).

One pair of the fœtal denticles has been preserved in this specimen; they are conical, slightly curved, with an unusually sharp and slender apex tipped by enamel. Though loose in their sockets, they project so little from them, and have such wide bases, that they have not fallen out; two smaller cavities in front, and the remains of a larger socket in the alveolar groove behind the retained teeth, attest the former presence of other teeth.

Hunterian.

Genus *Platanista.*

2481. The skull of a long and slender-jawed Dolphin from the Indus (*Platanista gangetica*, var. minor).

It shows all the characteristics that have been pointed out by Baron Cuvier (Ossemens Fossiles, tom. v. pl. 1. 4to, pp. 279, 299) and Prof. Eschricht (Annals and Mag. of Nat. Hist. 1852, vol. ix. pp. 161 & 279), but is of smaller size, the total length not exceeding twelve inches, and the anterior teeth being much longer, and more slender and acute. These differences may depend on the immaturity of the individual, but all the parts of the occiput have coalesced, and not any of the sutural unions manifest any mark of immaturity. There are twenty-one teeth on the left side of the upper jaw and nineteen teeth on the right side; but the alveolar grooves extend further back, indicating the former existence of teeth or germs of teeth which have been lost. There are twenty-six teeth on each side of the lower jaw, behind which is a short extent of an empty alveolar groove. The teeth in place are close together: the anterior ones in the lower jaw are an inch in length, slender, and sharp-pointed, with the points slightly incurved, and projecting outside those of the upper jaw: but the chief part

of the crowns of both the upper and under teeth fit into the interspaces of those of the opposite jaw, when the mouth is closed. The teeth progressively diminish in length, without decrease of basal breadth, as they are placed further back. A portion of the right tympanic bulla has been removed to expose its cavity and part of the petrosal within. In the length of the mandibular symphysis the *Platanista* resembles the *Physeter*: in the broad, converging, maxillary crests it resembles the *Hyperoodon*: in the expanse of the temporal fossæ, the strength of the zygomatic arches, the shortness of the molars and the smallness of the orbits, it is peculiar among the true Cetacea.

Presented by David Wallich, M.D.

2482. The upper and lower jaws of the long and slender-jawed Dolphin (*Platanista gangetica*).

The number of alveoli of the teeth in this specimen is :—$\frac{30-30}{32-32}$. Both the upper and lower maxillary bones are much elongated and compressed; the symphysis of the lower jaw is co-extensive with the long dental series, and the teeth rise so close to it that those of one side touch the others by their bases, except at the posterior part of the jaw; the lateral teeth are similarly approximated in the upper jaw at their median line of union, which line is compelled, by the alternate position of the teeth, to take a wavy course. In the preceding cranium of a much smaller and perhaps younger animal, the teeth of one side do not touch those of the other side. Contrary to the rule in the *Delphinidæ*, the anterior teeth retain their prehensile structure, while the posterior ones soon have their summits worn down to their broad bases. The implanted base of the tooth is remarkably expanded in the antero-posterior direction, and its outer surface is augmented by longitudinal folds like those of the teeth of Sauroid fishes, but weaker than in them: sometimes the posterior tooth is implanted by two short fangs, which is a still more exceptional character in the existing carnivorous Cetacea.

This specimen is the original of the figure given by Sir Everard Home in the 'Philosophical Transactions' for 1818, p. 419, pl. xx. It was presented by Dr. Roxburgh, who first figured the species in the 'Asiatic Researches' for 1781, to Sir Joseph Banks, and was presented by Sir Joseph to the College, through the hands of

Sir Everard Home, Bart., V.P.R.S.

Genus *Delphinus*.

2483. The skeleton of a female Bottle-nose Dolphin (*Delphinus tursio*).

The number of alveoli in the upper jaw is 23—23=46; that of the lower jaw 21—21=42. Of the 7 cervical vertebræ the first two are anchylosed together; the other vertebræ are 53 in number. Of these the thirteen anterior ones support moveable ribs: twenty-nine have transverse processes without ribs: the thirty-third vertebra from the skull first begins to support a hæmal arch; but in that and the two following vertebræ the hæmapophyses are disunited, and are represented by small flattened ossicles. The six terminal vertebræ consist of the centrums only, and are much depressed. The metapophysis begins to project from the

fore part of the diapophysis of the third dorsal, increases in length in the fourth dorsal, and is gradually transferred in the sixth and seventh dorsals to the outer side of the prozygapophyses: in the following vertebræ it seems to take their place, and to occasion a reversing of the usual relative position of the zygapophysis; for whereas in the cervical and anterior dorsal vertebræ the anterior zygapophyses are overlapped, as in other mammals, by the posterior zygapophyses, in the succeeding dorsals, beginning with the seventh, the posterior zygapophyses seem to be overlapped and concealed by the anterior zygapophysis; but the appearance is due to the place of the prozygapophyses being taken by the metapophyses. These latter processes, in fact, continue after the articular surface has ceased to be developed, and after the entire disappearance of the posterior zygapophyses, to project forwards from the thirteenth dorsal to the sixth lumbar vertebra inclusive; beyond which the neural arch is devoid of all exogenous processes, save the spine, until the middle caudal vertebræ, where rudiments of the metapophyses again reappear.

The radius and ulna are partially anchylosed with the short and thick humerus. The carpus consists of seven ossicles: the first on the radial side answers to the scaphoid and trapezium: the second is wedged into a distal cleft between the radius and ulna, and corresponds with the lunare in the Chelonian carpus and that of the Orang: the third is very small, and represents the cuneiforme: the pisiforme is separated from it by the junction of the cuboid with the ulna: the cuboid supports the rudiment of the fifth digit and part of that of the fourth: the magnum supports part of the fourth finger and a great part of the third: the trapezoides is moved to the interspace between the third and second digits, but principally supports the latter. The first digit, like the fifth, is represented only by a rudimental metacarpal bone. The larger metacarpal of the second digit supports seven phalanges; that of the third supports five phalanges and the terminal one seems to be lost; the metacarpal of the fourth here supports only one phalanx: all these, in the entire animal, are enveloped in a common fold of integument. The increase of the phalanges of certain digits beyond the number three is a remarkable instance of departure from the mammalian type and of affinity with the extinct enaliosauria and fishes. The four anterior ribs have a head and neck: the rest are suspended by the part answering to the tubercle to the ends of the transverse processes. The costal cartilages are partially ossified: the first four pairs articulate with the sternum: the original separations of the parts of that bone have disappeared. The first piece or manubrium has an anterior median notch and two broad lateral processes.

The 'Small Bottle-nose Whale' of Hunter, figured in the 'Philosophical Transactions' for 1787, pl. xviii., which was sent to him from Berkeley, Gloucestershire, by Dr. (then Mr.) Jenner, measured eleven feet long, and had 46 teeth in the upper and 50 teeth in the lower jaw. Cuvier assigns to the *Delphinus tursio* from 42 to 46 teeth in each jaw, so that the teeth seem to vary from 40 to 50 in each jaw.

The animal from which the present skeleton was obtained was taken by some fishermen with nets in shoal water, in company with a male, in a small bay below the Nore, June 1828. It survived many hours after having been dragged out of the water; during which time it emitted a sound not unlike the bellowing of a calf. The body was obtained, and presented to the Museum by

John Howship, Esq.

2484. The skull of the Bottle-nose Dolphin (*Delphinus tursio*), wanting the lower jaw.

The number of alveoli in the upper jaw is: 23—24=47. The teeth are directed from abovc obliquely downwards and forwards at a more acute angle than in younger specimens. A great proportion of the crown is worn away in all except the last two or three, and a large proportion of the unenamelled fang is exposcd, upon which their more oblique position and larger proportional size appear to dcpend.

Mus. Brookes.

2485. The skull of an apparently aged specimen of the *Delphinus tursio.*

All the teeth have been lost in this specimen, and the sockets are obliterated, except at the anterior part of the alveolar tracts, where they are very shallow. This animal has been subject to some injury or disease of the jaws, which has occasioned an ulcerated surfacc in the upper maxillary bone and in both rami of the lower jaw.

Hunterian.

2486. The skull of the Bottle-nose Dolphin (*Delphinus tursio*).

The number of alveoli in the jaws is :—$\frac{22-22}{21-19}$.

Hunterian.

2487. The petrotympanic bones of the Bottle-nose Dolphin (*Delphinus tursio*).

Hunterian.

2488. The cervical vertebræ of the Bottle-nose Dolphin (*Delphinus tursio*). The atlas and axis have coalesced. *Presented by Prof. Owen, F.R.S.*

2489. The skeleton of the common Dolphin (*Delphinus delphis*).

The number of alveoli in the jaws is :—$\frac{45-45}{46-46}$=182. Of the 7 cervical vertebræ the first two have become anchylosed together : there are 63 other vertebræ, of which the first fourteen bear moveable ribs, but it appears that a fifteenth pair of ribs is lost: thirty-four vertebræ have transverse processes without ribs: the forty-second vertebra from the skull begins to support hæmapophyses : the eight terminal vertebræ consist of the centrum only, and are much flattened. The metapophysis begins abruptly, as a long well-marked process, from the fore part of the diapophysis of the fourth dorsal, progressively approximates and attains the outside of the prozygapophysis in the eighth dorsal, performs the function of an articular process as far as the sixth lumbar, clamping, as it were, the sides of the back part of the base of the spine of the antecedent vertebra, disappears in the next dozen lumbar vertebræ, and

reappears in the caudal vertebræ at the fore-part of the base of the spine*. The six anterior pairs of ribs support hæmapophyses which unite directly with the sternum.

Presented by Sir Everard Home, Bart., V.P.R.S.

2490. The anterior portion of the upper jaw of a Dolphin (*Delphinus delphis*). It includes 31 teeth: the external alveolar wall has been removed, and a vertical section of the roots of the teeth has been made to expose their pulp-cavities.

Hunterian.

2491. The skull of a Dolphin (*Delphinus delphis*).

Number of alveoli :—$\frac{41-42}{44-44}=173$.

Hunterian.

2492. The skull of a Dolphin (*Delphinus delphis*), wanting the lower jaw.

Alveoli of the upper jaw :—49—51.

Hunterian.

2493. The skull of a Dolphin (*Delphinus delphis*).

Number of alveoli :—$\frac{48-48}{45-45}=186$.

Hunterian.

2494. The skull of a Dolphin (*Delphinus dubius*, Cuv.).

Alveoli of jaws :—$\frac{40-40}{40-40}=160$.

This skull differs from that of the *Delphinus delphis*, as Cuvier has observed, by the appearance of the vomer in a longitudinal space on the palate, between the maxillaries and premaxillaries: the palatal prominence formed by the palatine bones is broader and shorter,

* There are no anapophyses in the Cetacea, and the metapophyses seem hitherto to have been overlooked in this order. Cuvier, in his description of the vertebræ of the Dolphin, confounds them, as Straus-Durckheim has done in the Cat, with the true zygapophyses. He writes,—"The last cervical and the first six dorsals have their articular processes joined together by horizontal facets, of which the anterior looks upwards. At the sixth they begin to be oblique; at the seventh they are nearly vertical, the anterior looking inwards." But in the figure which he refers to, of the fourth dorsal vertebra of the *Delphinus delphis*, the accurate artist, M. Laurillard, represents the metapophyses as distinct from the prozygapophysis or anterior articular process, although less so than it is in nature; and it is incontestably the progressive development of this superadded process which gives rise to the change of position of the articular surface of the connate prozygapophysis: and the metapophysis continues to be developed, as the figures in the 'Ossemens Fossiles' demonstrate, long after the articular process or any articular surface has ceased to exist (May 1845).

and the grooves on each side are shallower and much shorter, not extending forward beyond the last four alveoli. The cranium is more convex behind, especially in the vertical direction, than in the *D. delphis,* and the supcroccipital ridge bends forwards towards the rudimental nasal bones.

Mus. Leverianum.

2495. The skull of a smaller specimen of *Delphinus dubius,* vertically and longitudinally bisected.

Number of alveoli :—$\frac{51-51}{50-50}$= 102.

Hunterian.

2496. The greater part of the maxillary, premaxillary and vomerine bones of the Fronted Dolphin (*Delphinus frontatus*).

The external alveolar wall has been removed from the whole of the left series of teeth to expose their implanted portion. The alveoli are 20 in number on the right side of the upper jaw : the anterior part of the left maxillary is broken, but sixteen sockets remain, twelve of which contain teeth.

Hunterian.

2497. The lower jaw of the *Delphinus frontatus.**

Number of alveoli :—22—24.

Hunterian.

2498. The mutilated skull, wanting the lower jaw, of the *Delphinus frontatus.*

Number of alveoli :—22—21.

Mus. Brit.

2499. The lower jaw of the *Delphinus frontatus.*

Number of alveoli :—23—22.

Mus. Brookes.

2500. The mutilated cranium of a Dolphin allied to the *Delphinus frontatus.*

The maxillary and mandibular arches are wanting, as well as the basioccipital. The ossified tentorium is exposed.

Hunterian.

2501. The cranium of a Dolphin allied to the *Delphinus frontatus.*

It has been deprived of the chief part of its maxillary portion and of its lower jaw, and a vertical and longitudinal section has been made in the line of the right occipital condyle, displaying the cranial cavity.

Hunterian.

2502. The right ramus of the lower jaw of a Dolphin (*Delphinus*).

Number of alveoli :—22.

Hunterian.

2503. The skeleton of the White-nosed Dolphin (*Delphinus leucoramphus*).

Number of alveoli :—$\frac{40-40}{40-40}=160$. The cervical vertebræ have coalesced: the other vertebræ are 51 in number, thirteen of which support moveable ribs: the thirty-eighth vertebra is the first to the centrum of which a hæmapophysis is attached.

Mus. Brookes.

2504. The lower jaw of a Dolphin (*Delphinus*).

The tip of the jaw appears to have been cut off. The number of alveoli is :—40—39.

Hunterian.

Subgenus *Delphinapterus.*

2505. The skull of the Beluga or White Dolphin (*Delphinus leucas*).

Number of alveoli :—$\frac{9-9}{9-9}$.

Mus. Brookes.

2506. The right moiety of a vertically bisected cranium of the Beluga (*Delphinus leucas*).

It shows the large size of the prefrontal bones, which have coalesced with the vomer, and ascend into view at the back part of the nostrils, where they coalesce with the frontals. The small nasal bones are wedged into an interspace between them and the frontals at the summit of the nasal apertures.

Hunterian.

2507. The lower jaw of the Beluga (*Delphinus leucas*).

The outer wall of the alveoli of the teeth has been removed from the right ramus: the exposed crowns of the teeth are more obtuse than that of their implanted fangs: the two anterior teeth are procumbent. Number of alveoli :—9—9.

Hunterian.

2508. The right ramus of the lower jaw of the Beluga, without the teeth.

Number of alveoli :—8.

Mus. Brit.

Subgenus *Phocæna.*

2509. The skeleton of the common Porpoise (*Delphinus phocæna*).

Number of alveoli:—$\frac{23-23}{23-23}=72$. Anchylosis has taken place in all the cervical vertebræ, and the head of the first rib rests upon their coalesced bodies. There are 56 other vertebræ, twelve of which support moveable ribs; but the thirteenth pair seems to have been lost.

Mus. South.

2510. The separated bones of the skull of a young Porpoise (*Delphinus phocæna*).

Presented by Prof. Owen, F.R.S.

2511. The left moiety of a vertically bisected cranium of a Porpoise (*Delphinus phocæna*). *Hunterian.*

2512. The cranium, deprived of the calvarium, of a Porpoise (*Delphinus phocæna*).

Number of alveoli:—25—25.

Presented by William Clift, Esq., F.R.S.

2513. An anterior dorsal vertebra of a Porpoise (*Delphinus phocæna*). *Hunterian.*

2514. A posterior vertebra of a Porpoise (*Delphinus phocæna*).

The transverse processes did not support ribs; they are long, and incline forward, as does the long spinous process.

Hunterian.

2515. The skull of the common Grampus (*Delphinus orca*, Linn.).

Number of alveoli:—$\frac{11-11}{12-12}=46$. The teeth are wanting. The sockets of the large intermediate teeth are subquadrate, with the longest diameter across the jaws. The symphysis is short, in the form of an unequal-sided triangle with the angles rounded off.

A specimen of this species, thirty feet in length, was captured in the Thames in the year 1793. Sir Joseph Banks transmitted a figure of it to M. de Lacépède.

Hunterian.

2516. The right petrotympanic bone of a Grampus (*Delphinus orca*). *Hunterian.*

2517. The skull of a Cape Grampus (*Delphinus orca*).

It is of somewhat smaller size, and differs from the preceding specimen chiefly in the greater development of the tuberosities and curved ridges at the sides of the superoccipital,

and in the less development of the median vertical ridge. The contour of the occiput at this part is straight: it presents a double sigmoid curve in the Great Grampus (*Delphinus orca*). The slender nasal processes of the premaxillaries form convex ridges in this skull: they are more flattened in the Great Grampus. There are two small additional teeth at the back of the series, which may depend upon the present specimen having belonged to a younger individual. The slight differences noticeable in the skull chiefly depend upon muscular attachment, and are of a kind to characterize varieties, not to establish specific distinctions.

Purchased.

2518. The skull of the Black Grampus (*Delphinus melas*).

Number of alveoli:—$\frac{12-12}{11-11}=46$. The teeth are moderately small, conical, subincurved, decreasing to the two extremes of the series. The fourth to the tenth inclusive are subequal. The symphysis of the lower jaw is subtriangular, and curves from below upwards at its extremity.

Hunterian.

2519. The skull of the Round-headed Grampus (*Delphinus globiceps*).

Number of alveoli:—$\frac{7-7}{8-8}=30$.

This skull corresponds closely with that of the *Delphinus globiceps* of Cuvier, figured in the 'Ossemens Fossiles,' tom. v. part i. pl. 21. figs. 11–13. It differs in the closer proximity of the occipital condyles to each other below, and the end of the flattened upper jaw is rather more obtusely rounded.

Presented by Fred. D. Bennett, Esq., F.L.S.

2520. The skull, wanting the lower jaw, of the Round-headed Grampus (*Delphinus globiceps*).

Number of alveoli:—10—10. The upper jaw is less obtusely rounded than in the preceding specimen: the teeth are relatively smaller, and more pointed. The outer margin of the superorbital arch is flatter, and joins the upper surface at a right angle, being separated from it by a ridge: in the preceding specimen the outer margin of the orbit is convex, and passes by a gradual curve into the upper surface. The whole of the upper surface of the beak being formed by the premaxillaries, in the present specimen, the maxillaries slope down more gradually, and therefore appear in the upper view of the skull.

Presented by Lieut. Colquhoun.

Genus *Monodon.*

2521. The skeleton of a female Narwhal (*Monodon monoceros*).

Beside the 7 cervicals, which are here unanchylosed, there are 56 vertebræ, twelve of which support moveable ribs, and six of these join the sternum. The twenty-seventh vertebra begins to have hæmapophyses attached to its centrum.

Mus. Brookes.

2522. The skull of a female Narwhal (*Monodon monoceros*).

The rudimental tusks, two in number, are exposed in their formative cavities, from which they do not emerge in this sex.

Hunterian.

2523. The skull, wanting the lower jaw, of a large male Narwhal (*Monodon monoceros*).

The left tusk is developed in this sex to form the so-called 'horn.' The abortive right tusk is displayed in its alveolus.

This is the ordinary state of the dentition in the adult male, and it appears to have been first described by Reisel, in the following passage: "In Musæo Stutgardiano cranii ejusmodi mutilati superior sola pars hinc inde fracta, longa duobus ped. lata pede uno sine maxilla inferiore, cum unicornu abrupto quidem, sed longo tamen adhuc tribus pedibus et unciis novem supra radicem seu basin, quæ latebat in rostri sinistro processu seu alveo, longam pede uno et unciis duabus, in dextro processu quoque per rimam nescio spontè aut violenta aliqua fractura hiscentem ostendat parvum ejusmodi cornu seu dentem longum ultra uncias octo, de cujus successione, præsentia, ortu et generatione tacet Wormius. Conjicio enim succrescere illud priori protenso longiori, si forte violentia aliqua, aut ætate, aut consuetudine, deciderit hasta illa ossea, vel si abruperit illam piscis, quod in glaciei ruptione haud raro contingere observatum fuit."—Dr. D. Salomonis Reiselii, "De Unicornu Marino duplici," Miscellanea Curiosa sive Ephemeridum, &c. 1702, p. 350. See also 'Odontography,' vol. i. p. 349.

Hunterian.

2524. The skull, wanting the lower jaw, of a male Narwhal (*Monodon monoceros*).

Hunterian.

2525. The skull, wanting the exserted tusk and lower jaw, of a male Narwhal (*Monodon monoceros*).

The left tusk is in this instance abortive: it is exposed, and has been longitudinally bisected.

Hunterian.

2526. The lower jaw of a Narwhal (*Monodon monoceros*). *Mus. Brit.*

2527. The left ramus of the lower jaw of a Narwhal (*Monodon monoceros*).

Mus. Brit.

2528. The tusk of a male Narwhal (*Monodon monoceros*). *Hunterian.*

2529. The tusk of a male Narwhal (*Monodon monoceros*). *Hunterian.*

2530. The tusk, longitudinally bisected, of a male Narwhal (*Monodon monoceros*). *Hunterian.*

2531. The tusk of a large male Narwhal (*Monodon monoceros*), with a portion of its alveolus. *Hunterian.*

2532. One moiety of a longitudinally bisected tusk of a male Narwhal (*Monodon monoceros*). *Hunterian.*

2533. The tusk of a male Narwhal (*Monodon monoceros*). *Hunterian.*

2534. One moiety of a longitudinally bisected and fractured tusk of a male Narwhal (*Monodon monoceros*). *Hunterian.*

2535. The tusk of a male Narwhal (*Monodon monoceros*). *Hunterian.*

2536. The tusk of a male Narwhal (*Monodon monoceros*).
Presented by Sir Charles Blicke.

2537. Proximal portion of a tusk of a male Narwhal (*Monodon monoceros*). *Hunterian.*

2538. The tusk of a male Narwhal (*Monodon monoceros*). *Hunterian.*

2539. The tusk, with a portion of its alveolus, of a young male Narwhal (*Monodon monoceros*). *Hunterian.*

2540. The tusk of a male Narwhal (*Monodon monoceros*). *Hunterian.*

2541. The abortive tusk of a Narwhal (*Monodon monoceros*).

It presents, at its base, the shallow pulp-cavity, which has an oblique position, and is surrounded by a thick margin, ragged from tubercles of cement: a similar tubercle occupies the middle of the conical depression for the pulp. It is marked by longitudinal spiral ridges.

Hunterian.

2542. The abortive tusk of a Narwhal (*M. monoceros*).
Presented by Henry Cline, Esq.

Order SIRENIA. (Cetacea herbivora, Cuvier.)

Genus *Halicore*.

2543. The skeleton of a female Malayan Dugong (*Halicore indicus*).

The tusks are full-grown, exserted, and slightly abraded outside the point; the base of the socket is open externally and exposes the pulp-cavity of the tusk. The molars are reduced to the last two on each side of both jaws. The pleurapophyses of the second, third, sixth and seventh cervical vertebræ have remained unossified, leaving an open notch for the vertebral artery. The neurapophyses of the sixth and seventh cervicals are unanchylosed above. There are 19 dorsal vertebræ, but the nineteenth pair of ribs are much shorter, straighter, and more slender than in the rest, and illustrate the nature of the transverse processes of the succeeding vertebræ, which are short and straight anchylosed ribs. The spinous processes rapidly increase in length from the last cervical to the fourth dorsal, and continue of equal length to near the middle of the tail. The iliac portion of the pelvic bones is shorter, and the ischial portion longer, than in the Australian Dugong (No. 2632). The first pair of hæmapophyses, herc preserved, are long, distinct from each other, and are articulated to the interspace between the sixth and seventh vertebræ, counting from the dorsal: the same elements forming, by the confluence of their lower ends, the 'chevron-bones,' arc articulated to the interspaces of the succeeding vertebræ as far as the nineteenth: the depressed terminal caudal vertebræ are wanting in this skeleton. A strong process is developed from the under part of the neck of the first rib. The distal epiphysis of the humerus has coalesced with the shaft, but those of the radius and ulna remain distinct. The first row of carpal bones consists of two, one articulated to the radius, the other to the ulna and fifth digit, and both to the single bone representing the second row. The first digit consists of a short metacarpal, the others have supported three phalanges.

Presented by Sir Thomas Stamford Raffles, P.Z.S.

2544. The skeleton of a young female Malayan Dugong (*Halicore indicus*).

The deciduous incisors of the upper jaw are present in their alveoli, but do not project beyond the surface. The germs of their successors are seen by a breach of the premaxillary bone. There are four alveoli on each side in the anterior, sloping, truncated part of the lower jaw; these are destitute of teeth. In the maxillary bones there are four open alveoli on each side, and one other closed, save where a very small aperture displays the germ of the tooth within. The molar series of the lower jaw presents a similar condition. There are 7 cervical vertebræ, the atlas and axis being separate. Besides these there are 56 vertebræ, nineteen of which support moveable ribs, and four pairs of these join the sternum: the three following have transverse processes joined by suture to the centrum. The thirty-second vertebra begins to have hæmapophyses. The first thirty-two vertebræ have their neurapophyses united by suture to their respective centrums.

Presented by Sir Thomas Stamford Raffles, P.Z.S.

2545. The skull of a male Malayan Dugong (*Halicore indicus*).

The incisive tusks are protruded and bevelled off obliquely from their outer side, and their sockets have the parietes entire, as is usual in this sex. The molar teeth are reduced to two on each side of both jaws. A small rudimental incisor is retained in the third socket, counting from below upwards, of the left side, lower jaw. The otosteals and the tympanic portion of the petrotympanic of the left side are wanting.

Presented by Hugh Cuming, Esq.

2546. The mutilated skull of a male Malayan Dugong (*Halicore indicus*).

The molar teeth are reduced to three in number on each side of both jaws. The outer parietes of the alveolus of the permanent incisive teeth of the upper jaw are entire. The basi- and ex-occipital bones are wanting.

Presented by Sir Thomas Stamford Raffles, P.Z.S.

2547. The mutilated skull of a female Malayan Dugong (*Halicore indicus*).

The molar teeth are reduced to three on each side of both jaws: the anterior one will be seen to be relatively smaller than in the female Australian Dugong (No. 2634) of corresponding age. The right alveolus of the upper incisor is laid open, and the tooth exposed; it has been bisected longitudinally, and shows the small size aud depth of the conical cavity for the pulp at its base. The summit of the last molar, left side of the lower jaw, has been removed, and the surface polished, showing the dentine and the thick surrounding layer of cement. The right squamosal has been removed, together with the petrotympanic bone, showing the loose manner in which the latter is lodged in the smooth cavity; a fracture of the squamosal exposes the dense texture of the bone.

Presented by Sir Thomas Stamford Raffles, P.Z.S.

2548. The skull of a young male Malayan Dugong (*Halicore indicus*), vertically and longitudinally bisected.

It shows the thickness and dense structure of the cranial walls. The sockets of the deciduous and permanent incisor and molar teeth are displayed in the left moiety. The deciduous incisor of the upper jaw was attached chiefly to the thick and callous gum covering the extremity of the premaxillary: its shallow socket is situated anterior to the lower extremity of that of the permanent incisive tusk: this has not yet been protruded: a longitudinal section has been removed from it, exposing its deep pulp-cavity with a widely open base.

This skull exemplifies the period when the molar series of teeth may be viewed in their most complete state. Not more than twenty molar teeth are developed in the present species of Dugong, viz. five on each side of both upper and lower jaws: but these are not in use at the same time, the first being shed before the last has cut the gum. The molar teeth increase very regularly in size; the fang of the first and that of the second is soon completed and solidified; that of the third is more elongated, and retains its basal cavity longer, but it becomes at length contracted to a point, solidified, partially absorbed, and the tooth is then

shed: the crown presents an irregular oval shape in transverse section. The fourth molar tooth, when fully formed, resembles a slightly bent cylinder, with a nearly smooth outer surface; the crown is flat or slightly depressed at the centre. The opposite extremity of the tooth is excavated by a regular conical cavity, lodging the remains of the pulp. With age, however, the fang contracts, takes on an irregularly fluted and tuberculated surface, and is at last closed at its extremity. The matrix of the last molar tooth expands as the crown is forming, and manifests a tendency to divide into two fangs; but, having acquired the size and form shown in the specimen, the pulp is maintained in a wide basal pulp-cavity to supply the waste of the crown according to that pattern.

Presented by Prof. Owen, F.R.S.

2549. The disarticulate bones of the head of a Malayan Dugong (*Halicore indicus*).

They are indicated by numbers on coloured labels according to the Table of Synonyms. The basioccipital is a triradiate bone, the two short rays diverging posteriorly to join the exoccipitals, and forming the lower end of each condyle. The exoccipitals almost meet above, and complete the foramen magnum: they are grooved, not perforated anterior to the condyle, and have a short, rough, subcompressed paroccipital process, which is perforated. The superoccipital is firmly anchylosed to the parietals, which have equally coalesced into a single subquadrate massive bone, with the sides bent down at nearly a right angle with the almost flat upper part, which is perforated by a 'foramen parietale' at the back part, near the confluence with the occipital. The basisphenoid has coalesced with the orbitosphenoids as well as with the alisphenoids: it has no sella turcica. The alisphenoids are grooved, not perforated, by the trigeminal nerve. The pterygoids are anchylosed to the base of the alisphenoids and the posterior ends of the palatines, which are wedged into the interspace between the pterygoid and ectopterygoid processes. The orbitosphenoids are perforated by widely separated optic foramina: they are anchylosed with the presphenoid, and these with the slightly-developed ethmoid. The cribriform plates are not half the size of those in the Manatee, and are lodged in deep fossæ surrounded by rugous portions of the ethmoid, homologous with the cells in land mammals. There is no crista galli. The frontals are not confluent; their orbital processes extend far forwards and outwards from the anterior angles: the median angles of the nasal border are slightly produced, but there is no trace of a suture marking out the proper nasals. The frontals are excavated almost to the posterior margin by the nasal cavity. The cranial plate of the frontal forms a small concave surface, not exceeding the depth and thickness of the posterior part of the bone to which it is confined: the orbital processes extend far forwards and outwards beyond the nasal part, which is excavated as far back as the coronal suture.

The maxillary is deflected anteriorly; its nasal and malar processes do not meet and circumscribe the great antorbital foramen, but this is closed by the upper end of the malar bone. The premaxillary is remarkable for its very large and long deflected alveolar portion, and for its slender elongated nasal portion: the base of the alveolus is open externally, indicating the female sex. The squamosal forms no part of the inner surface of the cerebral cavity, but is deeply and smoothly excavated for the lodgement of the dense petromastoid, with which the tympanic bone is anchylosed. The mastoid part forms a small rugged surface, wedged be-

tween the squamosal and exoccipital. The zygoma is massive, but is less developed than in the Manatee.

Presented by the Zoological Society of London.

2550. The petrotympanic bone and otosteals, or 'ossicula auditus,' of the *Halicore indicus.* The otosteals consist of the malleus, incus, and stapes.

Presented by Sir Thomas Stamford Raffles, P.Z.S.

2551. The cochlea and ossicula auditus of a Dugong.

Presented by Sir Thomas Stamford Raffles, P.Z.S.

2552. The ossicula auditus of a Dugong.

Presented by Sir Thomas Stamford Raffles, P.Z.S.

The following are parts of the same skeleton of a Malayan Dugong (*Halicore indicus*):—

Presented by Sir Thomas Stamford Raffles, P.Z.S.

2553. The first cervical vertebra, or atlas.

The transverse processes are imperforate, and are represented by short and tuberous parapophyses and diapophyses: the neural arch is perforated on each side near its anterior border.

2554. The second cervical vertebra, or dentata.

The transverse processes are represented by diapophyses only, and are consequently imperforate.

2555. The third cervical vertebra.

2556. The fourth cervical vertebra.

Its right transverse process only is pierced by the vertebral artery.

2557. The fifth cervical vertebra.

Its transverse processes are simply notched by the vertebral artery.

2558. The seventh cervical vertebra.

The left transverse process only is pierced by the vertebral artery. The lower lateral part of the centrum bears on each side an articular facet for the head of the first dorsal rib.

2559. The first dorsal vertebra.

The lateral part of the centrum bears two articular facets; one of which is smaller than the other, looks forward, and receives a part of the head of that rib which articulates with the preceding vertebra; the other looks backwards, and receives a large share of the head of the second dorsal rib. The transverse processes are long and strong, and present on their extremity an articular facet which receives the tubercle of the first free or dorsal rib.

2560. The second dorsal vertebra.

2561. The third dorsal vertebra.

2562. The fourth dorsal vertebra.

2563. The fifth and sixth dorsal vertebræ.

Anchylosis has united the extremities of the neural spines of these two vertebræ.

2564. The seventh dorsal vertebra.

2565. The eighth dorsal vertebra.

2566. The ninth dorsal vertebra.

2567. The tenth dorsal vertebra.

2568. The eleventh dorsal vertebra.

2569. The twelfth dorsal vertebra.

2570. The thirteenth dorsal vertebra.

2571. The fourteenth dorsal vertebra.

2572. The fifteenth dorsal vertebra.

2573. The sixteenth dorsal vertebra.

2574. The seventeenth dorsal vertebra.

2575. The eighteenth dorsal vertebra.

The rib has here a single articulation, viz. with the slightly raised transverse process.

2576. The first lumbar, or twenty-sixth trunk, vertebra.

This, and most of the succeeding vertebræ, have the ribs anchylosed to form long transverse processes.

2577. The second lumbar vertebra.

2578. The third lumbar vertebra.

2579. The fourth lumbar vertebra.

As the rudimental pelvic bones are usually suspended to this vertebra, it may be regarded as a sacral vertebra.

2580. The first caudal (thirtieth trunk) vertebra.

There are a pair of surfaces at the under part of the centrum, indicating that hæmapophyses were attached to it.

2581. The second caudal vertebra.

2582. The third caudal vertebra.

2583. The fourth caudal vertebra.

2584. The fifth caudal vertebra.

2585. The sixth caudal vertebra.

2586. The seventh caudal vertebra.

2587. The eighth caudal vertebra.

2588. The ninth caudal vertebra.

2589. The tenth caudal vertebra.

2590. The eleventh caudal vertebra.

2591. The twelfth caudal vertebra.

2592. The thirteenth caudal vertebra.

2593. The fourteenth caudal vertebra.

2594. The fifteenth caudal vertebra.

2595. The sixteenth caudal vertebra.

2596. The seventeenth caudal vertebra.

2597. The eighteenth caudal vertebra.

2598. The nineteenth caudal vertebra.

2599. The twentieth caudal vertebra.

2600. The ribs of the right side.

They are numbered consecutively from 1 to 18: the first rib is remarkable for the long oblique process from the under part of the neck, and for a shorter process terminated by a rough articular surface, as for a cartilage, from the inner border, two inches from the extremity to which the cartilaginous hæmapophysis was attached.

2601. The ribs of the left side.

They are numbered consecutively, like the foregoing.

2602. The sternum.

Its elements have coalesced into one bone; the costal articular surfaces occupy the middle third of its lateral borders.

2603. The right scapula.

2604. The left scapula.

2605. The right humerus.

2606. The left humerus.

2607. The right radius and ulna, united at their extremities by anchylosis.

2608. The left radius and ulna.

2609. The left scapholunar bone.

2610. The right scapholunar bone.

2611. The left cuneopisiform bone.

It affords articulation to the fifth metacarpal.

2612. The right cuneopisiform bone.

2613. The left coalesced carpal bones of the second row.

The single bone so formed supports the first four metacarpals.

2614. The right coalesced trapezium and trapezoides, anchylosed to the first metacarpal.

2615. The first metacarpal of the right fin.

2616. The first metacarpal of the left fin.

2617. The second metacarpal of the right fin.

2618. The second metacarpal of the left fin.

2619. The third metacarpal of the right fin

2620. The third metacarpal of the left fin.

2621. The fourth metacarpal of the right fin.

2622. The fourth metacarpal of the left fin.

2623. The fifth metacarpal of the right fin.

2624. The fifth metacarpal of the left fin.

2625. A phalangeal bone.

2626. An incisor tusk, from the upper jaw, of a male Malayan Dugong (*Halicore indicus*).

It is characterized by its obliquely-worn chisel-shaped exserted end, and by the wide and deep pulp-cavity at the implanted end.

Presented by Prof. Owen, F.R.S.

2627. An incisor tusk, from the upper jaw, of a female Malayan Dugong (*Halicore indicus*).

It is characterized by the shallow pulp-cavity, with oblique tumid margins, of the implanted base, and by the obtuse unworn point at the opposite end.

Presented by Prof. Owen, F.R.S.

2628. A rudimental or abortive incisor tooth, from the lower jaw, of an adult male Malayan Dugong (*Halicore indicus*).

The crown is irregularly eaten away by the absorbent process; its fang is closed at the extremity: it was buried in the gum in one of the shallow sockets of the sloping part of the symphysis of the lower jaw.

Presented by Prof. Owen, F.R.S.

2629. The second, third, fourth and fifth molar teeth of the upper and lower jaws of a Malayan Dugong (*Halicore indicus*).

Presented by Sir Thomas Stamford Raffles, P.Z.S.

2630. A molar tooth, vertically bisected, and with the cut surfaces polished, of a Malayan Dugong (*Halicore indicus*).

Presented by Sir Everard Home, Bart., V.P.R.S.

2631. A polished transverse section of a molar tooth of a Malayan Dugong (*Halicore indicus*). *Presented by Sir Everard Home, Bart., V.P.R.S.*

2632. The skeleton of a female Australian Dugong (*Halicore australis*).

The deciduous incisive tusks of the upper jaw have not been shed: the permanent ones, of which the left is exposed in the formative socket, are about four inches in length: the outer wall of the base of the socket has been removed by absorption, as is usual in the female sex. There are four molars, and a small vacant socket anterior to them on each side of both jaws: the last molar had just begun to cut the gums. The pleurapophyses are absent, or have not been ossified in the second, third, fourth and sixth cervical vertebræ, the transverse processes of which are accordingly notched, not perforated, by the vertebral artery. The neurapophyses of the fourth and fifth cervicals have not coalesced above. There are 19 dorsal vertebræ: the first three pairs of ribs join the sternum: a strong process bends forwards from the under part of the neck of the first rib. From the third to the nineteenth vertebræ the ribs are of nearly equal length. 31 vertebræ succeed the dorsal. The pelvic bones are suspended to the fifth of this series. Two detached hæmapophyses are attached to the sixth, and a second pair to the interspace between the sixth and seventh of these vertebræ. The hæmapophyses coalesce at their lower extremities to form chevron bones, which are articulated to the interspaces of the succeeding vertebræ as far as the fourteenth. The pelvic bones consist of a long and slender rib-like ilium, coalesced with a similar but shorter ischium, and seem to have been loosely attached at both ends.

The specimen from which this skeleton was obtained was taken in Shark's Bay, North Australia.

Presented by Lieut. Helpman, R.N.

2633. The skull of a full-grown male Australian Dugong (*Halicore australis*).

The alveoli of the exserted tusks of the upper jaw are entire, as in the male of the Malayan species; but they are not quite so broad and thick in proportion to the length of this deflected part of the jaw. The molars are reduced to the last two of the series on each side of both jaws. The superoccipital has coalesced with the parietal, but not with the exoccipitals. The incisive tusks are smaller, and the penultimate molars larger, than in the Malayan Dugong (No. 2545). The median ridge of the deeply-grooved palate is less developed. The tympanics and otosteals are preserved in this skull. The alveolar disk of the sloping symphysis of the lower jaw is longer and narrower than in the Indian species.

Purchased.

2634. The skull of a female Australian Dugong (*Halicore australis*).

From the non-protrusion of the upper incisive tusks, the extremities of which are obtusely pointed, and from the open state of their alveoli, this specimen may be concluded to have belonged to a female. It is of full size and mature age, the molar teeth being reduced to three in number on each side of both jaws. The petrotympanic bones are preserved. The alveoli of the abortive incisors of the lower jaw are four in number on each side of the long sloping symphysis. There are two perforations in the middle line of the parietal bones.

The specimen to which this skull belonged was taken in Port Essington, North Australia.

Presented by J. B. Jukes, Esq., F.G.S.

2635. Most of the bones of the cranium of the Australian Dugong (*Halicore australis*).

The chief distinction between this and the Indian species is here seen in the presence of an additional alveolus at the beginning of the molar series, on each side of both jaws, making the total number of these teeth, developed in the *Halicore australis*, 24. The series is arranged in a stronger curve, with the convexity outwards in the upper jaw. The falciform ridge of the coalesced parietals is much sharper in the present species. The pterygoid processes of the sphenoid are more deeply excavated posteriorly, and the true pterygoid bones are thicker. The sockets of the deciduous incisors are relatively deeper ; those of the germs of the permanent incisors are exposed externally at their base, indicating the specimen to be afemale. In the lower jaw, the third sockets of the incisors, counting from below, are much deeper than the rest, showing that they have lodged normally developed teeth.

Presented by J. B. Jukes, Esq., F.G.S.

2636. A penultimate molar tooth of the *Halicore australis*.

Presented by J. B. Jukes, Esq., F.G.S.

2637. A last molar tooth of an old *Halicore australis*, with a small tumour of cement at one margin of its base. *Presented by J. B. Jukes, Esq., F.G.S.*

2638. An upper incisive tusk of a female *Halicore australis*, showing the oblique position and tumid border of the shallow and almost obliterated pulp-cavity.

Presented by J. B. Jukes, Esq., F.G.S.

2639. One of the ribs of the *Halicore australis*. It has a rudimental tubercle about one inch and a half from the head: there is a slight projection from the posterior margin, three inches below the tubercle.

Presented by J. B. Jukes, Esq., F.G.S.

2640. A posterior rib of the same side of the same *Halicore australis,* showing a similar but more developed projection from the posterior margin, a little lower down. *Presented by J. B. Jukes, Esq., F.G.S.*

2641. A rib of the same *Halicore australis,* with the posterior process more developed. *Presented by J. B. Jukes, Esq., F.G.S.*

2642. A pair of ribs of the same *Halicore australis,* showing the same peculiar process from the posterior margin nearly half-way down the rib.

Presented by J. B. Jukes, Esq., F.G.S.

2643. A more posterior pair of ribs of the same *Halicore australis,* with the posterior process in the same position. *Presented by J. B. Jukes, Esq., F.G.S.*

2644. A rib, longitudinally bisected, of the same *Halicore australis.* The posterior processes in this and the foregoing specimens resemble the anchylosed appendages of the same part of the ribs in birds.

Presented by J. B. Jukes, Esq., F.G.S.

2645. The right and left scapula of the *Halicore australis.*

Presented by J. B. Jukes, Esq., F.G.S.

2646. The petrotympanic bone and two of the otosteals, viz. the malleus and incus, of the *Halicore australis.* *Presented by J. B. Jukes, Esq., F.G.S.*

Genus *Manatus.*

2647. The skeleton of a young female Manatee (*Manatus americanus*).

The two deciduous incisor teeth of the upper jaw are shed, and a section of the right premaxillary shows the absence of any germ of a permanent one. The alveoli of the molar teeth are $\frac{6-6}{6-6}$, of which the last one on each side in both jaws contains the germ of a tooth. The atlas and axis are not anchylosed together; only four distinct neural arches intervene between these and the dorsal vertebræ, or those supporting moveable ribs, of which there are 17 pairs. The twenty-fifth vertebra bears short pleurapophyses articulated to its transverse processes; the transverse processes of the remaining 25 vertebræ are long, but progressively diminish, and are, at last, mere tubercles. The twenty-ninth vertebra begins to support hæmapophyses and indicates the commencement of the caudal region. The neurapophyses of the first twenty-nine vertebræ are joined by suture to their respective centrums.

Presented by Sir Everard Home, Bart., V.P.R.S.

2648. A mutilated skull of a young Manatee (*Manatus americanus*).

The occiput, both petro-tympano-mastoids, and the right temporal bone, are wanting. The massive proportions of the zygomatic process of the remaining temporal, the curved, broad, orbital process of the malar and its squamous overlapping of the corresponding part of the maxillary, the sutural articulation of the orbital plate of the maxillary with the nasal plate of the same bone, the fossæ for the lodgement of the amygdaloid nasals, the inverted arch of the palatal processes of the maxillary, the thick deflected ends of the premaxillaries, and the dense texture of all the bones, are remarkable features of the present skull. The glenoid cavity is rough: the large cavity in the squamosal for the lodgement of the petro-tympano-mastoid is quite smooth.

A portion of the right premaxillary bone has been removed above the shallow alveolus of the small abortive incisor, which demonstrates the absence of any concealed socket of a successional tooth. The deflection of the end of the upper jaw to the right is accidental, and peculiar to the specimen. The molars of the American Manatee, according to Daubenton and Cuvier, are 36 in number, but they are never simultaneously in place and use: their crowns in the upper jaw are square, and support two transverse ridges with trituberculate summits, having also an anterior and posterior basal ridge: each tooth is implanted by three diverging roots, one on the inner and two on the outer side; they increase in size very gradually from the foremost to the last. The crowns of the anterior molars of the lower jaw resemble those above, but the posterior ones have a larger posterior tubercle; they are all implanted by two fangs, which enlarge as they descend and bifurcate at the extremity. In the present specimen the alveoli of the molar teeth are $\frac{7-7}{7-7}$ in number, of which $\frac{6-6}{6-6}$ have been fully developed and in place.

Hunterian.

2649. The skull of a Manatee (*Manatus americanus*).

There are six teeth in place on the left side and five on the right, one having been lost in front. The seventh tooth on each side is on a level with the alveolus, whilst the eighth is sunk deep in its socket. There are traces of alveoli in the premaxillaries, but no teeth are present. The right squamosal and petro-tympano-mastoid have been removed.

Mus. Brit.

2650. A right rib of a Manatee (*Manatus americanus*). *Mus. Brit.*

2651. A right rib of a young Manatee. *Hunterian.*

2652. A right rib of a large Manatee. *Mus. Brit.*

2653. A rib, longitudinally bisected, of a Manatee (*Manatus americanus*).

Hunterian.

UNGULATA.

Order PROBOSCIDEA.

Genus *Elephas.*

2654. The skeleton of a large male Indian Elephant (*Elephas indicus*).

The vertebral formula is:—7 cervical, 20 dorsal, 3 lumbar, 3 sacral, and 31 caudal. The last pair of ribs has not been preserved. Anapophyses are developed from the sixteenth dorsal, and articulate with metapophyses from the seventeenth. The same joints are superadded to the ordinary articular processes, as far as the last lumbar. Both tusks have been fractured. Five pairs of ribs directly join the sternum, of which in the present articulated skeleton but two bones are preserved, two others being represented by models. The epiphyses are still detached from the bodies of the vertebræ and from the long bones of the extremities, except the proximal end of the radius.

The animal from which this skeleton was obtained was brought to England in the year 1810, when it was of a size not too great to be exhibited on the stage of Covent Garden Theatre in a pantomime; and was probably not less than ten years old. It was next exhibited in a travelling menagerie by Mr. Polito, and at his death, in 1814, was purchased by Mr. Cross, for the collection of live animals then kept at Exeter Change. Here it continued to live and grow, and was submissive to the control of its keepers until the year 1820, when it was first subject to excitement, and attempted to kill a keeper. Similar paroxysms recurred, with increasing force, annually, until the year 1826, when the violence of the animal was such as to compel the proprietor of Exeter Change to put it to death. The particulars of the catastrophe are detailed in Hone's 'Every-day Book,' and in Griffith's translation of Cuvier's 'Règne Animal,' vol. iii. p. 348.

Purchased.

2655. The base of the left tusk of the same male Elephant.

It shows, by the irregular deposit of osteodentine in the pulp-cavity, and by the destruction of part of the parietes of the same cavity, the evidence of the inflamed state of the large matrix of the tusk, which may probably have aggravated the excited and ungovernable state of the animal previous to its being put to death.

Purchased.

2656. The skull of a large male Elephant from Ceylon.

The penultimate and part of the last molars were in use. The last seven plates, with the common dentinal base of some anterior plates of the penultimate grinders, have been worn, and the first five plates of the last lower molars; but only the anterior angles of the last

upper ones had come into use. The tusks attached at present to the sockets of this skull are from another and smaller Elephant. The length of the skull is 46 inches.

Purchased.

2657. The skull of a male Elephant from Malacca.

The last seven plates of the penultimate molar, and the first four or five plates of the last molar, were in use in both jaws. The length of this skull is 36 inches.

Presented by Dr. Henderson.

2658. The skull of a female Elephant, with incomplete occipital condyles and zygomata.

The outer parietes of the molar sockets have been broken away and the teeth removed. There is a well-marked pit for the stylohyal at the back part of the petrotympanic bone. The length of this skull is 35 inches.

Hunterian.

2659. The skull of a male Elephant, wanting the malar bones.

The fifth or penultimate molars were in use. In the upper jaw two or three of the anterior plates are reduced to their common dentinal base, the summits of the succeeding eleven plates are worn, and there are three or four hinder ones not yet touched. The formative sockets of the succeeding molars are exposed. In the lower jaw thirteen plates are worn in the right ramus, and twelve plates in the left ramus, in addition to the common dentinal base, which is exposed anterior to the summits of the plates; a gubernacular hole behind the molars leads to the formative socket of the succeeding molar. The length of this skull is 33 inches.

Hunterian.

2660. The skull of a female Elephant.

The last three or four plates of the penultimate, and the first five or six plates of the last molars, were in use. The length of this skull is 32 inches.

Hunterian.

2661. The skull of a female Elephant from Malacca.

The last nine plates of the penultimate and the first three plates of the last molars were in use. The length of this skull is 32 inches.

Presented by Dr. Henderson.

2662. A mutilated skull of a female Elephant.

This appears to have only the last molar teeth, of which nine plates of the right and seven of the left have come into use; such plates being succeeded by many others, some of which are hidden in the formative socket. The length of this skull is 32 inches.

Hunterian.

2663. The skull of a young male Elephant.

The malar bones are wanting: the alveolar processes have been broken away, and the teeth removed, excepting the right fourth molar, in which some of the anterior plates have been worn down to their common dentinal base; the summits of ten succeeding plates have come into use; the two posterior plates are still untouched. The length of this skull is 28 inches.

Hunterian.

2664. The skull of a young male Elephant.

The right malar bone is wanting. The fourth molars are in place. Of these the first ten plates have come into use; the two posterior plates are untouched. The sockets of the third molars are obliterated: a wide, gubernacular, grooved canal leads from the back part of the fourth socket to the closed socket of the fifth molar. The length of this skull is 25 inches.

Hunterian.

2665. The skull of a young male Elephant.

The lower jaw is attached, and the right tusk in place: it curves inwards. The molar teeth present a peculiarity. The chief part of the one which is in use exhibits the summits of ten plates on the left, and of eleven plates on the right side; these appear to be the last plates of the third or fourth molar, from the fore part of which some plates have been worn away. On both sides of the jaw this molar is continuous with a larger posterior one, the division being indicated by a slight constriction on each side of the tooth, by a thick mass of cement, and by a process from the outer and inner borders of the alveolus which fits into the base of the lateral constriction. The first four plates of the second confluent tooth have begun to be worn from the left side. The molar teeth in the under jaw present the same peculiarity, the boundary between the two confluent teeth being indicated on the right side by lateral constrictions, and corresponding growths from the borders of the sockets. The length of this skull is 23 inches.

Hunterian.

2666. The skull of a young male Elephant.

The third molars are in place, of which the nine anterior plates have come into use; the last three are still covered by the cement in the upper jaw. In the lower jaw eleven plates of the third molar are worn, and there are two behind untouched. The alveolus of the left tusk has been exposed, and the tusk removed. The malar bones are wanting. The length of this skull is 22 inches.

Hunterian.

2667. The skull of a young male Elephant.

The malar bones and the exoccipitals are wanting. The last six plates of the second molar and the first seven plates of the third molar were in use: the third molar consists of twelve plates. In the lower jaw the remains of the second molars have been removed. The third molar consists of thirteen plates, nine of which have been in use. The length of this skull is 19 inches.

Hunterian.

2668. The skull of a young Elephant.

The right deciduous tusk, and the germs of both permanent tusks, have been preserved. The second molars are in place, of which seven plates were in use; the eighth is covered with cement. The germ of the third molar has been removed from the left side of the upper jaw; its fore part is exposed in the right side. The length of this skull is 13 inches.

Hunterian.

2669. The right ramus of the lower jaw of a young Elephant.

The common dentinal base of the last three plates of the second molar, with the remnant of a long and much-absorbed fang, is retained, and the third molar is in place with nine of its plates worn by use: behind this is seen the gubernacular orifice leading to the otherwise closed alveolus of the fourth molar.

Hunterian.

2670. The lower jaw of a young Asiatic Elephant.

The third molars are in place, of which eleven plates have come into use: behind them are large gubernacular orifices leading to the formative alveoli of the fourth molars.

Hunterian.

2671. The right ramus of the lower jaw of an older Elephant.

The last nine plates remain of the molar in use, and the first six of the succeeding molar are visible through the enlarging aperture of its formative socket. The rounded and inflected angle, the lofty condyloid process, the wide entry to the dental canal, the dense structure of the back part of the short and thick symphysis, are characters worthy of notice in the lower jaw of the Elephant.

Hunterian.

2672. The lower jaw of a somewhat older Elephant.

The antepenultimate molar is in place, of which the first eleven plates have come into use: behind these is the gubernacular orifice leading to the formative alveolus of the penultimate molar.

Hunterian.

2673. The lower jaw of a somewhat older Elephant.

The last eleven plates, and the common dentinal base of some anterior ones, are exposed in the antepenultimate molar, and the first six plates of the penultimate molar are visible through the enlarging orifices of the socket.

Hunterian.

2674. A similar-sized lower jaw of an Elephant.

The last ten plates of the antepenultimate molar are abraded, and the summits of five plates of the penultimate molar are exposed.

Hunterian.

2675. The lower jaw of an older Elephant.

Twelve plates and the common dentinal base of a few anterior plates of the penultimate molar tooth are worn, and some of the posterior unworn plates are exposed; behind which is seen a gubernacular orifice leading to the socket of the succeeding molar.

Hunterian.

2676. The right ramus of a somewhat older but smaller (female?) Elephant.

The last nine plates of the penultimate molar are worn, and the first three plates of the succeeding molar have begun to be abraded.

Presented by Dr. Henderson.

2677. A somewhat larger lower jaw of an Elephant.

The last remnant of the penultimate molar is retained, and the first eleven plates of the last molar have been in use.

Hunterian.

The following are parts of the skeleton of a young Asiatic Elephant:—

Hunterian.

2678. The atlas.

The articular surfaces for the occipital condyles are reniform, and a smooth compact layer of bone encroaches upon the part corresponding to the pelvis of the kidney. The posterior articular surfaces are confluent with that for the odontoid process. The short transverse processes are widely perforated for the medullary artery, which afterwards perforates on the left, and grooves on the right side, the fore part of the neurapophyses.

2679. The vertebra dentata.

The anterior articular surfaces are continuous with that below the odontoid process: traces of the original separation of this process remain on the middle line above and below. The short and thin transverse processes are widely perforated. The thick obtuse spine bifurcates posteriorly. The hinder epiphysis of the body of the dentata is unanchylosed.

2680. The third cervical vertebra.

The neurapophyses are united with the centrum and with each other, below, by suture; they have coalesced together above: they form the upper fourth of the body of the vertebra, and the epiphyses, which are unanchylosed, are coextensive with both the neurapophysial and central parts of that body.

2681. The fourth cervical vertebra.

The costal part of the transverse process is produced forwards.

2682. The fifth cervical vertebra.

A short and slender spine is developed from the summit of the neural arch. The antroverted costal part of the transverse process is connate with the parapophysis, but has not coalesced with the diapophysis.

2683. The sixth cervical vertebra.

Ossification has not been continued through the whole of the costal part of the transverse process, and the ossified part does not join the diapophyses, but leaves the passage for the vertebral artery an open groove. The neural spine has increased in length.

2684. The seventh cervical vertebra.

The unanchylosed epiphysis has been removed from the fore part, to show the proportions of the body respectively contributed by the centrum and the neurapophyses. The transverse processes consist of diapophyses only. The articular surface for the head of the first free or dorsal rib is formed, half by the neurapophysis and half by the centrum. The neural spine has much increased in length, but is slender.

2685. The first dorsal vertebra.

This is remarkable for the strength as well as the height of the neural spine. The diapophyses are shorter and thicker than in the neck. The surfaces for the first and second ribs meet at an acute margin below; they are formed as in the preceding vertebra.

2686. The fourth dorsal vertebra.

The neural spine is still more remarkable for its height and strength than in the first dorsal: the vertebral body has a greater antero-posterior thickness, but the anterior and posterior costal surfaces still meet below. A larger proportion of these surfaces is contributed by the neurapophyses.

2687. The sixth dorsal vertebra.

2688. The ninth dorsal vertebra.

The posterior costal surfaces, which are almost exclusively formed by the neurapophyses, are separated by a non-articular tract from the anterior ones.

2689. The sixteenth dorsal vertebra.

This shows only a single pair of costal surfaces, which are wholly formed by the neurapophyses: the metapophyses are well-developed.

2690. The seventeenth dorsal vertebra.

The costal surfaces are smaller, and the metapophyses begin to receive the anterior articular surfaces from the zygapophyses.

2691. A lumbar vertebra.

The diapophyses are short and slender, with rudiments of anapophyses at their back part.

2692. The three partially coalesced sacral vertebræ.

In each of these the neurapophyses have coalesced with the pleurapophyses and the centrum.

2693. The right scapula.

A thick epiphysis covers the border at the base of the spine: the descending process from the spine is well-developed. The acromion is short and pointed: the coracoid is a low, rough tuberosity, confluent with the scapula.

2694. The right humerus.

The upper epiphysis is formed of two parts, one constituting the articular head, the other the great tuberosity: the distal epiphysis is single.

2695. The right ulna.

The proximal epiphysis covers only the olecranon: the distal epiphysis forms the articular surface for the radius and carpus.

2696. The right radius.

The proximal articulation is transversely elongate, partly convex and partly concave. An epiphysis is present only at the distal end, where it is of large size.

2697. The right scaphoides.

The small surface for the radius is remote from that which supports the trapezium and trapezoides.

2698. The right lunare.

2699. The right cuneiforme.

2700. The right pisiforme.

The single articular surface is divided into two facets, the smaller of which joins the ulna.

2701. The right trapezoides.

2702. The right os magnum.

2703. The right unciforme.

2704. The right os innominatum.

2705. The right femur.

The proximal epiphysis consists of the part forming the hemispheric head, and the part forming the great trochanter. The head of the femur shows no depression for a ligamentum teres. The orifice of the principal medullary artery enters the back part of the lower third of the shaft, and inclines upwards.

2706. The right tibia.

2707. The right astragalus.

2708. The right calcaneum.

2709. The right naviculare.

2710. The left entocuneiforme.

2711. The right mesocuneiforme.

2712. The right ectocuneiforme.

2713. The right cuboides.

The following, to No. 2723 inclusive, are parts of the skeleton of a very young Elephant:—
Purchased.

2714. The neural arch of the occipital vertebra.

The centrum (basioccipital) is notched behind, and contributes there the lower ends of the occipital condyles: it increases in thickness as it advances to form the flat rough surface for junction with the centrum in advance (basisphenoid). There is a rough depression on each side of the under surface for the insertion of the 'recti capitis antici.' The neurapophyses (exoccipitals) have no condyloid foramina, and do not develope paroccipital processes: they meet above to complete the foramen magnum. The neural spine (superoccipital) is much expanded, and supports two supplementary bones (interparietals).

2715. The neural arch of the parietal vertebra, with the temporal and malar bones.

The centrum (basisphenoid) has coalesced with the neurapophyses (alisphenoids), which are separated from the neural spine (parietals) by the intercalated squamosals. The pterygoid processes are long, much expanded and excavated anteriorly, and are perforated at their base. The alisphenoids are notched at their posterior and anterior margins, but are not perforated. The apex of the petrosal is deeply grooved by the entocarotid. The post-tympanic, or connate mastoid, process meets the post-glenoid process below and circumscribes the meatus externus. The tympanic completes the lower wall of the meatus, expands into a large bulla, and has coalesced with the petrosal. The stylomastoid foramen is between the mastoid and the base of attachment for the stylohyal developed by the tympanic. The squamomastoid has not yet coalesced with the petrotympanic.

2716. The neural arch of the frontal vertebra, with the neurapophyses of the nasal vertebra and portions of the coalesced capsule of the olfactory sense-organ.

The frontal neurapophyses (orbitosphenoids) have coalesced with each other at their base, and also with those of the nasal vertebra (laminæ mediæ æthmoidei): they are perforated by the optic foramina and by those for the nerves and vessels of the orbit. The portions of the olfactory capsule closing the anterior orifice of the cranial cavity form extensive 'cribriform' plates.

2717. The atlas.

It consists of the two neurapophyses and the hypapophysis, which are connected together by dried fibro-cartilages: the neurapophyses are united to each other above by suture; the right one developes both a diapophysis and a parapophysis, which processes circumscribe the arterial foramen, and meet, but are still distinct. The left neurapophysis developes only the diapophysis, which is imperforate. Both neurapophyses are grooved, and the left one perforated, near the upper and anterior border, by the vertebral artery.

2718. The dentata and three following cervical vertebræ.

The centrum of the first cervical vertebra is still distinct, but is attached to that of the second vertebra, of which it forms the odontoid process. The neurapophyses of each of the present vertebræ have coalesced above, but are separate from each other and from their respective centrums below: they develope long diapophyses and short parapophyses from the outer side of their base. The pleurapophyses, which are afterwards ossified continuously with the parapophyses, here present the condition of dried cartilages.

2719. The sixth cervical vertebra.

It shows the proportions of the body contributed by the still separate neurapophyses: the terminal epiphyses are cartilaginous.

2720. One of the anterior dorsal vertebræ.

It shows the proportion of the articular surface for the head of the rib which is formed by the neurapophysis.

2721. A sacral vertebra.

It shows the proportions of the articular surface for the iliac bones formed by the neurapophyses and the centrum respectively.

2722. The last sacral vertebra.

In this the neurapophyses have coalesced with the centrum as well as with each other.

2723. The right os innominatum.

It shows the proportions in which the three constituent bones enter into the formation of the acetabulum. The ischium and pubis have coalesced below. There is a small accessory ossicle wedged between the ischium and pubis behind the acetabulum.

2724. A section of the cranium of the Asiatic Elephant.

It exposes the right half of the cranial cavity, the cribriform plate, the superior turbinal bones, and the extensive and complex air-cells that separate the vitreous from the outer table of the cranium: these cells are extended backwards and penetrate the basioccipital and superoccipital. The petrosal is perforated by the entocarotid canal, but is not impressed by any cerebellar pit. There is a well-marked depression in the compartment for the middle lobe of the cerebrum. The anterior parietes of the rhinencephalic compartment are well defined.

Hunterian.

2725. A section of the upper parietes of the cranium of an Elephant, showing the thin, compact, outer table, and the extensive mass of air-cells forming the diploë. *Hunterian.*

2726. The left nasal bone and contiguous portion of the right one which has been vertically and longitudinally bisected, of an Elephant.

The entire bone is occupied by large air-cells continued from those of the frontal bones. The wide aperture of communication may be seen at the back part of the left nasal.

Mus. Brit.

2727. The left nasal bone of an Elephant, with the thin parietes at the back part broken away to expose the air-cells. *Hunterian.*

2728. A section of the cranium of a young Elephant, exposing the meatus auditorius externus, membrana tympani, tympanum, and beginning of the eustachian tube, with some of the surrounding air-cells. The otosteals are shown *in situ*. The basioccipital and exoccipital have not yet coalesced.

This specimen is the original of the figure in the 'Lectures on Comparative Anatomy,' by Sir Everard Home, V.P.R.S., vol. iv. tab. xcviii., and it is noticed in the 'Croonian Lecture,' by the same author, in the 'Philosophical Transactions,' vol. xc. p. 4.

Hunterian.

2729. The otosteals, or ossicula auditûs, of an Elephant, three years old.

Purchased.

2730. A transverse section of the left os humeri of a young Elephant.

It shows the thickness of the compact walls and the delicate filamentary cancellous structure which occupies the centre of this part of the shaft.

Hunterian.

2731. The upper part of the left radius, longitudinally bisected, of a young Elephant.

The epiphysis has coalesced with the shaft.

Hunterian.

2732. A transverse section from the middle of the shaft of the same radius.

Hunterian.

2733. The lower half of the same radius, including the still ununited epiphysis, longitudinally bisected. *Hunterian.*

2734. Five transverse sections of the left ulna of a young Elephant.

The central filamentary cancellous structure is very delicate, resembling fine lace-work: it appears to have been removed from one of the sections.

Hunterian.

2735. The upper half of the diaphysis of the left femur of a young Elephant, from which a longitudinal section has been removed.

It shows the progressive increase of the compact outer wall as the shaft descends and diminishes, and the delicate reticulate cancellous structure which occupies the whole of the included space, save that where the parietes are left entire at the lower end of the section, and where a small medullary cavity is exposed, into which the canal for the medullary artery opens after a short course from behind forwards and downwards.

Hunterian.

2736. The longitudinal section removed from the foregoing specimen. *Hunterian.*

2737. One moiety of a longitudinally bisected lower half of probably the same femur.

It shows the gradual occupation of the medullary cavity by the light cancello-reticulate structure, about three inches below the upper part of the section.

Hunterian.

2738. The other moiety of the same section. *Hunterian.*

2739. The upper part of the diaphysis of the left femur, longitudinally bisected, of a young Elephant. *Hunterian.*

2740. One moiety of a longitudinally bisected lower half of the diaphysis of the left femur of a young Elephant. *Hunterian.*

2741. The other moiety of the same portion of femur, from which a transverse section has been removed. *Hunterian.*

2742. The upper third of the left tibia, including the epiphysis, longitudinally bisected, of a young Elephant.

It shows the commencement of the small medullary cavity at its lower end.

Hunterian.

2743. The middle third of the same tibia.

It shows the termination of the small medullary cavity about three inches below the upper end. The canal for the medullary artery passes transversely from the back part of the shaft, forwards, into the cavity.

Hunterian.

2744. The lower third of the same tibia, with the epiphysis, longitudinally bisected.

Its substance is occupied with a cancellous structure of a coarser character than that of the femur.

Hunterian.

Tusks of the Asiatic Elephant.

2745. A pair of tusks.

One of these measures $57\frac{1}{2}$ inches in length and $12\frac{5}{8}$ inches in basal circumference; the other measures 50 inches in length and $12\frac{1}{2}$ inches in basal circumference. The exterior surface is deeply stained. Both tusks exhibit a slight spiral curve.

Presented by Sir Stamford Raffles, P.Z.S.

2746. A single tusk.

It measures 53 inches in length and $11\frac{5}{8}$ inches in basal circumference; the exterior surface is stained, and most deeply at the apex, which has been smoothly polished by use: this tusk also exhibits a slight spiral curve.

Presented by Sir Stamford Raffles, P.Z.S.

2747. A pair of tusks.

These are of smaller size, are slightly curved, and chiefly in one direction.

Presented by Sir Stamford Raffles, P.Z.S.

2748. A pair of tusks.

These are of similar size to the foregoing, but are more curved, and chiefly in one direction.

Presented by Sir Stamford Raffles, P.Z.S.

2749. A pair of tusks.

These are of smaller size than the preceding pair, and show a less degree of curvature.

Presented by Sir Stamford Raffles, P.Z.S.

2750. A pair of tusks.

These are of smaller size than the preceding, but have a similar degree of curvature, chiefly in one direction.

Presented by Sir Stamford Raffles, P.Z.S.

2751. One of the tusks of a young Elephant, which has been irregularly worn.

Presented by Sir Stamford Raffles, P.Z.S.

2752. One of the tusks of a young Elephant, showing a slight spiral curvature.

Presented by Sir Stamford Raffles, P.Z.S.

2753. One of the tusks of a young Elephant, showing a considerable degree of curvature, with a slight tendency to the spiral direction. *Hunterian.*

2754. One of the tusks of a young Elephant, with a greater degree of curvature, almost on the same plane.

Hunterian.

2755. A pair of tusks of a young Elephant.

They are nearly straight, and obliquely abraded at the point.

Presented by Mrs. Robinson.

2756. One of the tusks of a young Elephant.

It shows an abnormal form in the direction of its growth, being wreathed in two long spirals: a fissure in the pulp-cavity leads to a longitudinal groove on the outer surface, where the ivory has been incompletely formed.

Mus. Brit.

2757. One of the tusks of an older, and probably African, Elephant.

It shows a similar abnormal spiral curvature. This specimen is figured and described in Grew's '*Musæum Regalis Societatis,*' 1681, p. 31. "A spiral or wreathed tusk of an Elephant. Presented from the Royal African Company by Thomas Crispe, Esq. It is twisted or wreathed from the bottom to the top with three circumvolutions, standing between two straight lines. 'Tis also furrow'd by the length. Yet the furrows surround it not, as in the horn of the Sea Unicorn; but run parallel therewith. Neither is it round, as the said horn, but somewhat flat. The top very blunt." *Fig. tab.* 4.

Mus. Brit.

2758. A transverse section of the base of the tusk of a young Elephant.

It shows the smooth surface of the pulp-cavity and the longitudinally striated outer surface. The contour is elliptic. On the cut surfaces may be discerned the decussating curved striæ characteristic of true ivory, an appearance which is due to its microscopic structure. (See Owen's Odontography, p. 640.)

Presented by Prof. Owen, F.R.S.

2759. A transverse section of the tusk of an Elephant.

Through long exposure this has partially separated into superimposed laminæ. From a nearly effaced inscription it appears to have been originally transmitted to the British Museum as part of a Mammoth's tusk, found fossil; and it is probably from a female of the *Elephas primigenius.* The inference as to the composition of ivory by superimposed and successively excreted layers, founded upon such appearances as this and similar fossil tusks present, is fallacious: a truer indication of the texture of ivory is afforded by the decussating curved lines or engine-turned pattern which may be seen on both the cut surfaces of this section.

Mus. Brit.

2760. Portions of several layers into which the tusk, probably of a Mammoth (*Elephas primigenius*), has been resolved. *Mus. Brit.*

2761. A section of the base of the tusk of an Elephant, in the substance of which a

brass bullet has been imbedded, in a closed cavity with a smooth and entire inner surface.

The parietes of the cavity next the pulp-cavity, into which they project with a slight convexity, are fully half an inch thick; the outer parietes are fully an inch in thickness. There was no outward indication of the presence of such foreign body.

The following appears to be the explanation of this phænomenon:—A ball aimed at the head of an Elephant may penetrate the thin bony socket and the thinner ivory parietes of the wide conical pulp-cavity occupying the inserted base of the tusk. If the projectile force be then spent, the ball gravitates to the opposite and lower side of the pulp-cavity. The presence of the foreign body exciting inflammation of the pulp, an irregular course of calcification ensues, which results in the deposition around the ball of a certain thickness of osteodentine. The pulp, then resuming its healthy state and functions, coats the surface of the inclosing mass of osteodentine, together with the rest of the conical cavity into which that mass projects, with layers of normal ivory, closing the breach in the thin parietes of the pulp-cavity by which the ball entered; and as the growth of the tusk proceeds, the ball, so inclosed, is carried forwards into the solid exserted part of the tusk.

Mus. Brit.

2762. A section of the tusk of an Elephant, in which an iron ball is imbedded.

The external wall of the cavity is scarcely two lines in thickness, but shows no trace of the entry of the bullet; the inner wall appears to have been much thicker.

Presented by Thomas Blizard, Esq., F.R.S.

2763. A transverse section from near the base of the tusk of an Elephant, exposing half of a leaden bullet imbedded in a mass of osteodentine which fills up a great part of the pulp-cavity.

In this section there are marks of external injury on opposite sides of the diseased part of the tusk.

Hunterian.

2764. A section of the tusk of an Elephant, showing a cavity near the outer surface in which a flattened leaden ball is fixed.

The outer wall of the cavity appears to be formed by normal ivory, three lines in thickness: the inner wall is formed of the irregular substance called osteodentine.

Presented by William Clift, Esq., F.R.S.

2765. Two sections of the base of the tusk of an Elephant, into the pulp-cavity of which the iron point of a javelin has penetrated, and has been broken.

A mass of osteodentine surrounds this foreign body: the weapon has originally pierced the thin wall of the socket and the vascular pulp, its point having been broken off and left there;

it has given rise to the inflammation of the pulp, and its consequent irregular conversion into osteodentine.

Presented by Thomas Keate, Esq.

2766. Three sections of the base of the tusk of an Elephant, with an irregular mass of osteodentine filling up part of the pulp-cavity, in which mass is imbedded a large iron slug. *Presented by the Right Hon. Lord Denman.*

2767. A mass of osteodentine from the tusk of an Elephant, perforated by an irregular central canal, in which some foreign body may have been contained.

This specimen was transferred from the British Museum, but had neither number nor history.

Mus. Brit.

2768. A portion of the diseased tusk of an Elephant.

Presented by Sir P. de M. Grey Egerton, Bart., M.P.

2769. Two thin transverse slices removed from one end of the preceding specimen, showing the proportions and relative position of the ivory, cement and osteodentine. *Presented by Sir P. de M. Grey Egerton, Bart., M.P.*

Structure of the Molar Teeth of the Asiatic Elephant.

2770. The last right upper molar.

The molar teeth of the Elephant are remarkable for their great size, even in relation to the bulk of the animal, and for the extreme complexity of their structure. The crown, of which a great proportion is buried in the socket, and very little more than the grinding surface appears above the gum, is deeply divided into a number of transverse perpendicular plates, consisting each of a body of dentine, coated by a layer of enamel, and this by the less dense bone-like substance which fills the interspaces of the enamelled plates, and here more especially merits the name of 'cement,' since it binds together the several divisions of the crown before they are fully formed and united by the confluence of their bases into a common body of dentine.

In this example the molar consists of twenty-two plates, and two or three, in course of formation at the back part of the tooth, have been detached and lost. As the growth of each plate begins at the summit, they remain detached, and like so many separate teeth or denticles, until their base is completed, when it becomes blended with the bases of contiguous plates to form the common body of the crown of the complex tooth, from which the roots are next developed. The lateral margins of the plates are rounded, and, though covered by a thick cement, still project so as to give a vertically ribbed surface to the sides of the complex molar.

The formation of each grinder begins with the summits of the anterior plate, and the rest

are completed in succession: the tooth is gradually advanced in position as its growth proceeds, and, in the existing Indian Elephant, the anterior plates are brought into use before the posterior ones are formed. When the complex molar cuts the gum the cement is first rubbed off the digital summits, then their enamel cap is worn away, and the central dentine comes into play with a prominent enamel ring; the digital processes are next ground down to their common uniting base, and a transverse tract of dentine, with its wavy border of enamel, is exposed; finally, the transverse plates themselves are abraded to their common base of dentine, and a smooth and polished tract of that substance is produced; from this basis the roots of the molar are developed, and increase in length to keep the worn crown on the grinding level, until the reproductive force is exhausted.

In the present grinder the enamelled summits of nine plates are exposed, and in the different degrees above described: in the ninth plate, only two of the mammilliform processes appear: in the eighth a row of five such summits, the two middle ones of which are blended together: in the seventh only the terminal ones of the transverse series continue distinct: the first and second plates are worn down to their common uniting base of dentine. Two short and thick fangs are developed from the part of the tooth supporting these plates. The base of a common pulp-cavity has begun to be formed beneath the middle series of plates: the last six plates have their hollow bases still free. In this tooth the characteristics of the molar of an upper jaw are shown in the slight convexity of the grinding surface; and, the tooth being held with that surface downwards and the worn end forwards, the convexity of the side to the right hand shows it to have come from the right side of the upper jaw.

Hunterian.

2771. A constituent denticle of one of the lamellæ of a molar tooth.

Presented by Prof. Owen, F.R.S.

2772. A portion of a longitudinally divided constituent denticle of a molar tooth, showing the pulp-cavity at its base; the layer of enamel surrounding the solid part of the dentine analogous to the crown, and general external coat of rough cement. *Presented by Prof. Owen, F.R.S.*

2773. One of the constituent plates of a molar tooth, consisting of five denticles united together at their bases.

Such detached plates offer a rude resemblance to a hand, and fossil ones of the Mammoth (*Elephas primigenius*) may be found figured in some old works on Petrifactions, under the name of ' Cheirolites,' as the fossilized hand of a monkey or child.

Presented by Prof. Owen, F.R.S.

2774. One of the constituent plates of a molar tooth a little more developed, and the constituent denticles more extensively united; the pulp-cavity of the common base has begun to be contracted. *Presented by Dr. Henderson.*

2775. A portion of one of the constituent plates of a molar tooth, from which a transverse slice has been removed and the cut surface polished, showing the central body of dentine, the surrounding layer of enamel, and the thin coat of cement which has begun to be formed upon the enamel.

Presented by Prof. Owen, F.R.S.

2776. A tray of separate constituent plates of a molar tooth, in different stages of growth. *Presented by Dr. Henderson.*

2777. A tray of separate constituent plates of a molar tooth.

Presented by Sir Everard Home, Bart., V.P.R.S.

2778. A series of ten constituent plates of an upper molar tooth: only the first and second have begun to coalesce at their base. *Hunterian.*

2779. The series of plates of the corresponding molar tooth from the opposite side of the upper jaw. *Hunterian.*

2780. The second molar tooth, right side, lower jaw, longitudinally and vertically bisected.

It consists of nine plates, which are all united at their bases by continuity of dentine, and, in the rest of their extent, by the thick covering of cement: the several cavities of the plates communicate with a common pulp-cavity, the walls of which are formed by the bases of two hollow roots.

Presented by Sir Everard Home, Bart., V.P.R.S.

2781. The moiety of a vertically bisected upper molar.

It consists of fourteen plates, of which the bases of the first eight are confluent by continuity of dentine, and the whole are united together by the cement.

The interblended three substances of which this complex molar consists are well demonstrated in the present section, and the relative density of the enamel, dentine, and cement, is shown by the degree in which they are worn on the surface which has been in use.

Hunterian.

2782. The moiety of a vertically bisected upper molar.

It consists of eleven plates, all of which are confluent at their bases, and all but the last have been in use, the anterior ones being worn down to the common dentinal base. Several roots are developed from this base.

Presented by Sir Everard Home, Bart., V.P.R.S.

2783. The moiety of a vertically bisected upper molar of a Mammoth (or extinct species of Elephant), *Elephas primigenius.*

The constituent plates, of which thirteen are preserved in a longitudinal extent of five inches three lines, are relatively deeper, as well as more numerous, than in the Asiatic or any other existing species of Elephant, and indicate a provision for the grinding down of coarser vegetable food, which accords with the higher latitudes in which the Mammoth existed.

Hunterian.

2784. A horizontal section, including seven plates and the common dentinal base of some anterior ones.

It is polished, and shows well the three substances of which the Elephant's grinder consists, the dentine being inclosed by the wavy lines of enamel, and the whole surrounded by a thick crust of cement.

Hunterian.

2785. A polished section of a molar, in the form of a knife-handle, illustrative of the economical application of the beautiful interblended constituents of this complex tooth. *Hunterian.*

2786. The basal moiety of a horizontally bisected molar tooth.

It has consisted of upwards of ten plates, the anterior ones having become blended together, and the whole united by the cement. Several fangs are developed from this molar, the anterior ones being the longest and most pointed: the parallel crenate borders of the cut surface of the plates characteristic of the *Elephas asiaticus* are well shown in this section.

Hunterian.

2787. A portion of a horizontally bisected upper molar.

It includes the summits of six constituent plates, the three anterior of which have come into use; the rest are covered by a thick crust of cement, which appears to have a denser layer along the inner border.

Hunterian.

2788. The basal portion of a horizontally bisected lower molar, including six plates and the confluent bases of others which were supported by a long fang.

Hunterian.

2789. The basal portion of a lower molar tooth from which several fangs have been developed; the interspaces between the ununited parts of the plates are very narrow. *Hunterian.*

2790. The basal portion of a horizontally divided upper molar, in which the constituent plates are blended together by a common median tract of dentine, and the enamel describes a continuous deeply-festooned line on each side.

Hunterian.

2791. The basal portion of a horizontally divided molar, showing a further stage of formation, the constituent plates being more completely confluent, and the enamel reduced to four insular strips, including as many masses of cement.

Hunterian.

Succession of the Molar Teeth in the Asiatic Elephant.

2792. The maxillary and premaxillary bones of a very young Elephant, including the first and second molars, and the sockets of the deciduous and permanent tusks.

The first molar consists of four principal plates, with accessory tubercles attached to the first and fourth. The plates are blended together at their base, which is implanted by two long divergent fangs. Eight plates of the second molar are developed, the first three of which are blended together, and the first plate has a smaller accessory plate.

Presented by Dr. Henderson.

2793. A mutilated cranium of a young Elephant, in which the second molar has come into use, and the first molar appears to have been shed.

The first four plates, with the anterior accessory plate of the second molar, have come into use, and all the plates have become confluent and are supported by two fangs. The deciduous tusks are shed; the remains of their sockets may be seen external to those containing the apices of the permanent tusks.

Hunterian.

2794. A mutilated cranium of a more advanced young Elephant.

The sockets of the deciduous tusks and first molars are obliterated, the second molars are reduced to the common dentinal base of the three posterior plates, and the first seven plates of the third molar have come into use. This molar consists of thirteen plates: some of the detached plates of the succeeding molar are exposed in its formative alveolus.

Hunterian.

2795. The nine anterior plates of the third molar, left side, upper jaw: the bases of the first three plates have coalesced. *Hunterian.*

2796. The second and third molars, right side, upper jaw.

The second molar has been reduced to the dentinal base of the last five plates, which are supported by as many long fangs with closed and pointed extremities. The third molar consists of twelve plates, of which the summits of the first six have been in use.

Hunterian.

2797. The second and third molars of the left side of the same jaw. *Hunterian.*

2798. The germ of the fourth molar, right side, upper jaw, including thirteen of the constituent plates.

Of these, the first four are united by continuity of the dentine at their base; the rest are cemented together, and the constituent denticles of the hindmost plates are well shown.

Presented by Dr. Henderson.

2799. The corresponding tooth from the left side of the same jaw.

Presented by Dr. Henderson.

2800. The anterior moiety, including eight plates, of the fourth molar, upper jaw.

Hunterian.

2801. The left maxillary bone, with a remnant of the third molar, and with the fourth molar in its fullest state of development.

The third molar is reduced to the common dentinal base of the last four plates: the fourth molar consists of fourteen plates, of which the six anterior ones have come into use: a portion of the formative alveolus of a fifth molar is seen behind it.

Hunterian.

2802. The fourth molar, from the right side of the upper jaw of the same skull.

Hunterian.

2803. The fourth molar, right side, upper jaw, in its completest state of growth, the first plate not being worn away, and the last plate being completely formed and blended with the rest.

The total number of plates is sixteen: the fore part of the tooth is supported by distinct fangs: the hind part shows a common widely opened pulp-cavity.

Presented by Dr. Henderson.

2804. Part of the germ of the fifth molar, right side, upper jaw, including eleven plates, of which the bases of the first three have coalesced; these are six inches in length, or vertical extent. *Presented by Dr. Henderson.*

2805. The nine anterior plates of the corresponding molar, from the left side of the same jaw.

The bases of the first and second are confluent, and those of the third and fourth have coalesced on the right side.

Presented by Dr. Henderson.

2806. A fifth molar, left side, upper jaw.

A few of the anterior plates, probably three, have been worn down to their common uniting base of dentine, which presents an even polished surface by attrition: the sixteen other plates are confluent at their bases, and, with the exception of the last six, they are supported by distinct roots arranged in pairs.

Hunterian.

2807. The fifth molar, right side, upper jaw, of which all but the last thirteen plates have been worn away. *Hunterian.*

2808. The sixth, and probably last molar, left side, upper jaw.

It consists of twenty-two plates, and some appear to be wanting from the hinder end, where they are not confluent, and have been fractured: the eight anterior plates have come into use, and these are supported by distinct fangs. The most complete unworn plate is $8\frac{1}{2}$ inches in length.

Presented by Mrs. Robinson.

2809. The last molar, left side, upper jaw, in which the hinder part of the tooth is folded forwards, as it were, upon the inner concavity.

It consists of from twenty-six to thirty plates, but the number is not readily definable from the distorted character of the tooth: ten of the plates have come into use, and fangs are developed from their confluent bases.

Hunterian.

2810. The lower jaw of a very young Elephant, in which the first molar has cut the gum, and the crown of the second may be seen in its formative alveolus.

The first molar consists of four plates, with accessory tubercles to the first and last: the second molar consists of eight plates, of which the first four have become confluent at their base: portions of a few of the plates of the third molar may be seen in the alveolus, behind that of the second, with which it communicates by a large vacuity in the middle of the septum. The length of this jaw, in a straight line from the angle to the symphysis, is 9 inches.

Presented by Dr. Henderson.

2811. The left ramus of the lower jaw of a young Elephant, showing a similar stage of dentition.

The inner wall of the socket of the first molar has been removed, to show the long base of its two diverging fangs: the germ of the second molar is similarly exposed.

Presented by Dr. Henderson.

2812. The second molar, right side, lower jaw.

It consists of eight plates, and a few accessory tubercles behind the last: the bases of the six anterior plates are confluent; the apices of the first and second have been in use, and these, with the third, are supported by a distinct root: its length (antero-posterior diameter) is three inches.

Hunterian.

2813. The left ramus of the lower jaw of a young Elephant, in which the first molar has been shed and its socket obliterated, the second molar reduced to the common dentinal base of the last three or four plates, and the third molar is in a full state of development, with nine of the fifteen plates in use.

The inner wall of the sockets has been removed to show the much-absorbed root of the second molar, the commencing roots of the third molar, and eight plates of the fourth molar in its formative alveolus: only the first and second of these plates have coalesced at their base. The length of the third molar is 5 inches 4 lines. The length of the jaw is 15 inches.

Hunterian.

2814. The third molar, right side, lower jaw.

It consists of twelve plates, and had probably one or two more, which have been worn away from the anterior end: all the remaining plates, save the last, have come into use. The anterior part of the tooth is supported by two distinct bifurcate fangs. The length of this tooth is 5 inches 4 lines; its greatest depth, 4 inches 4 lines.

Presented by Dr. Henderson.

2815. The corresponding tooth from the left side of the same lower jaw.

The anterior fang has been broken away.

Presented by Dr. Henderson.

2816. A portion of the left ramus of the lower jaw; containing the remains of the second, the whole of the third, and part of the formative socket of the fourth molar.

The third molar consists of thirteen plates, of which the six anterior have come into use.

Hunterian.

2817. The germ of a fourth molar, consisting of twelve plates, the first five of which have become confluent at their base. *Hunterian.*

2818. The left ramus of the lower jaw, with the inner alveolar wall removed, to show the fourth molar in place and use, and the germ of the fifth in its formative alveolus.

Of the fourth molar ten plates remain, and all but the last have been in use. The long and slender anterior fang is exposed. The length of this tooth is 5 inches 6 lines. The plates are thicker than in the third molar, in No. 2815. The length of the ramus is $20\frac{1}{2}$ inches.

Hunterian.

2819. A fourth molar, from the right ramus of the lower jaw.

It consists of fourteen plates, twelve of which have been in use, and the first, which is worn to the root, may have been the common supporting base of two plates. The length of this molar is 6 inches 4 lines; its greatest depth is 4 inches 3 lines: but the fangs have not been developed from the hinder part of the tooth.

Mus. Brit.

2820. The remains of the fourth molar, from the right side of the lower jaw.

It has been reduced to the eight posterior plates which are supported upon very long fangs; the greatest depth of the tooth being 6 inches 3 lines.

Hunterian.

2821. The left ramus of the lower jaw, with the fifth molar in its most complete state, the remnant of the alveolus of the fourth molar, and the commencing formative socket of the sixth molar: these are all exposed by the removal of the inner parietes of the sockets.

The fifth molar consists of fifteen plates, twelve of which have been in use, and the first six are supported on two distinct fangs. The length of this molar is 8 inches; its greatest depth anteriorly is 5 inches 6 lines. The length of the ramus is 19 inches 6 lines.

Hunterian.

2822. The fifth molar, right side, lower jaw.

It is reduced to its twelve posterior plates, all of which have come into use. The common dentinal base of some worn-down anterior plates is supported on two slender roots, and the fore and inner part of the radical base of the rest of the molar has developed several similar distinct roots. The length of this tooth is 8 inches 6 lines; its greatest depth is 6 inches.

Presented by Dr. Henderson.

2823. A corresponding tooth, from the left side of the same lower jaw.

Presented by Dr. Henderson.

2824. The left ramus of the lower jaw, with the inner alveolar wall removed, to expose the remains of the fifth molar, and the major part of the sixth molar tooth.

The fifth molar has been reduced to its last nine plates, which are supported upon a base subdivided into many slender curved fangs. The sixth molar consists of eighteen plates, of which the first four plates have come into use, and the last three are still detached. The total length of this molar is 9 inches. The dental canal expands into a sinus, which separates the thin and smooth proper wall of the alveolus from the outer plate, or thick proper wall of the ramus of the jaw. The hindmost part of the proper wall of the socket is compressed and produced backwards, but is not perforated, nor shows any indication of the beginning of a succeeding socket. The length of the ramus is $21\frac{1}{2}$ inches.

Presented by Dr. Henderson.

2825. The sixth, and probably last, molar tooth, left side, lower jaw.

It consists of eighteen plates, but the worn anterior end may have been the common dentinal base of two or three other plates. Long and separate roots have been developed from the anterior half of this tooth. Its total length is 12 inches; its greatest depth is 7 inches.

Hunterian.

2826. The germ of the sixth molar tooth, left side, lower jaw.

It consists of nineteen plates, of which the first five are confluent at their bases.

Presented by Dr. Henderson.

2827. The germ of the sixth molar tooth, right side, of the same lower jaw.

It consists of twenty-one plates.

Presented by Dr. Henderson.

Miscellaneous Molars of the Asiatic Elephant.

2828. A portion of the last molar tooth, right side, lower jaw.

It includes eleven of the constituent plates, of which the first five have begun to be worn, but the root is not developed beneath these.

Presented by Dr. Henderson.

2829. A portion of the last molar tooth, left side, lower jaw.

It includes eleven plates, all of which have been in use.

Hunterian.

2830. A portion of the germ of the last molar, right side, lower jaw.

It includes seventeen plates, but some are wanting from the hinder end, and only the anterior plate has been obliquely worn.

Presented by Dr. Henderson.

2831. A portion of the last molar of the lower jaw.

It includes thirteen plates, none of which have come into use.

Presented by Dr. Henderson.

2832. Fourteen detached lamellæ of the germ of the last molar of the lower jaw.

Presented by Dr. Henderson.

2833. Nine lamellæ of the germ of the last molar of the lower jaw.

The first three are confluent at their base, but none have been in use.

Presented by Dr. Henderson.

2834. Seven lamellæ and some of the constituent denticles of the last molar of the upper jaw.

The first two plates are confluent at their base.

Presented by Sir Everard Home, Bart., V.P.R.S.

2835. Ten of the constituent plates of a last molar tooth.

The first six plates are confluent at their base.

Presented by Dr. Henderson.

2836. Five plates of the germ of a last molar tooth, confluent at their base.

Presented by Dr. Henderson.

2837. The last remnant of a third or fourth molar.

It is reduced to the bases of four lamellæ, and the fangs have been absorbed, so that it fell out naturally from an Elephant of about twenty-four years of age.

Presented by Colonel Everett, H.E.I.C.

2838. A corresponding remnant of the opposite molar, from the same Elephant, which was similarly shed about two months after the preceding.

Presented by Colonel Everett, H.E.I.C.

2839. The last remnant of apparently the second molar of a young Elephant, which has been naturally shed and the major part of the fang absorbed. *Hunterian.*

2840. The hinder part of a molar, showing the plates worn very obliquely.
Purchased.

2841. The hinder part of a lower molar, with the plates worn rather obliquely, and supported by a long root of confluent fangs. *Mus. Brit.*

2842. The hinder part of a lower molar, supported on a long and hollow compressed root. *Mus. Brit.*

2843. The hinder part of a fifth molar, upper jaw, obliquely and irregularly worn, and with the fangs absorbed and apparently carious at the fore part of its base.

The following note was transmitted with the specimen:—

"This grinder was extracted from the mouth of one of the Hon. East India Company's Elephants at Trichinopoly, in the year 1814. The animal having become much emaciated and refusing his rations, the cause was sought for, and found to arise from a carious tooth, which it was determined should be extracted. To this end an instrument was formed similar to a balling-iron, or such as is commonly used for administering a ball of medicine to a horse; only that it was made of very tough wood. The animal was then placed in such a position under a large banyan tree, that his tusks could be lashed to two of its branches, and his proboscis or trunk secured to one of his own tusks by a rope. The before-mentioned instrument was then introduced between his jaws, when his keeper, passing a small but strong rope through the orifice, hitched it over a small notch which may be observed in the tooth, and giving a strong and steady pull brought away the tooth, the animal very shortly after recovering his health and strength.

(Signed) "W. Ireland Jones,
"Major, 18th Regt. M.N.I."

"25th Sept. 1824."

Presented by Henry Cline, Esq.

2844. A portion of the molar tooth from a corresponding part of the lower jaw of the same Elephant.

It is less obliquely worn, but shows a similar absorbed or carious condition of the base of the crown. It was extracted in the same manner as the preceding molar.

Presented by Henry Cline, Esq.

The following, to No. 2864 inclusive, are parts of the African Elephant (*Elephas Africanus*):—

2845. The skull of a young male African Elephant.

This differs from that of the Indian species in having no concavity above the nasal bones and in the much shallower depression at the fore part of the premaxillaries; the occipital

surface of the skull also inclines forwards, from below, in a much greater degree. Seven plates of the upper and eight of the lower molar in use on each side of both jaws have been abraded: the tusks are long, slender, slightly curved, and sharp-pointed.

Mus. Brookes.

2846. The lower jaw of a larger African Elephant, from which all the teeth have been removed, except the anterior molar on the left side.

Of this tooth the last seven plates and the common dentinal base of two or three anterior plates have been exposed by use.

Hunterian.

2847. A similar-sized lower jaw of an African Elephant.

The teeth have been removed from the right ramus, and the remnant of the anterior tooth of the left ramus. Seven plates of the succeeding molar have been in use, and two others are still covered by the cement; behind this tooth appears the gubernacular orifice of the formative socket of the succeeding molar.

Hunterian.

2848. The last left upper molar of the African Elephant.

The constituent plates are fewer and thicker than in the Asiatic species, and are dilated in the middle, which gives a lozenge-shape to the enamelled contour of their abraded summits: these have been so exposed in the six anterior plates of the present molar tooth; three other unworn plates succeed these, and one or more posterior ones are wanting in the present molar.

Hunterian.

2849. A constituent plate of the molar of an African Elephant, with one of the pair of fangs which are developed from the basal interspace of two plates.

In this specimen is well shown the thickness of the enamel surrounding the dentinal body of the plate.

Presented by Sir Everard Home, Bart., V.P.R.S.

2850. Three of the constituent plates of the same molar tooth, showing the thickness of the masses of cement intervening between the narrower parts of the plates.

Presented by Sir Everard Home, Bart., V.P.R.S.

2851. A portion of the germ of an upper molar of an African Elephant.

It includes five plates, which have become confluent at their bases and have their summits covered by a very thick crust of cement. Only the first plate has begun to be worn.

Hunterian.

2852. A portion of an upper molar, including the six posterior plates, of an African Elephant. *Hunterian.*

2853. The corresponding lower molar, from the same side, including nine of the plates, of an African Elephant. *Hunterian.*

2854. A molar tooth, probably the fourth, left side, upper jaw, of an African Elephant.

It consists of nine plates, the first five of which have been in use.

Hunterian.

2855. The remnant of a much-worn upper molar of an African Elephant.

From the absorbed state of the fangs this molar appears to have been naturally shed. It includes six plates, the first three of which have been worn down to their common dentinal bases.

Mus. Brit.

2856. A portion of a much-worn upper molar of an African Elephant.

It includes seven of the posterior plates, which are supported by strong convergent fangs. The different density of the three constituent substances is well shown by the degrees in which they have resisted the abrading forces.

Hunterian.

2857. A molar, probably the last, left side, upper jaw, of an African Elephant.

It includes eight plates, the first five of which have come into use, and have roots developed from their base.

Hunterian.

2858. An upper molar of an African Elephant.

It includes seven plates, and some that were behind these have been broken away. Six of the remaining plates have been in use.

Hunterian.

2859. A portion of the left ramus of the lower jaw, with a molar tooth, of an African Elephant.

The molar consists of nine plates, the first six of which have been in use.

Hunterian.

2860. A corresponding molar from the left side of the lower jaw of an African Elephant.

It consists of nine plates, of which nine have been in use.

Mus. Brit.

2861. A succeeding molar, right side, lower jaw, of an African Elephant.

It consists of nine plates, of which the first four have been in use.

Hunterian.

2862. Part of the germ of a lower molar of an African Elephant.

It includes five plates, the first two of which have coalesced at their base.

Hunterian.

2863. One moiety of a portion of a much-worn molar, vertically and longitudinally bisected, and polished. *Presented by Sir Everard Home, Bart., V.P.R.S.*

2864. The other moiety of the same section, unpolished.

Presented by Sir Everard Home, Bart., V.P.R.S.

2865. One moiety of a vertically and longitudinally bisected molar of an extinct Elephant (*Elephas Hysudricus*).

The component plates resemble in thickness those of the Elephant, but are of greater depth: twelve of these plates are shown in the present section, six of which have been in use.

Presented by Dr. Falconer, F.R.S.

Order PERISSODACTYLA (*Pachydermes à doigts impaires*, Cuv.).

Genus *Tapirus.*

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{4-4}{3-3}$, $m\,\frac{3-3}{3-3}=42$.

2866. The skeleton of the Malayan Tapir (*Tapirus indicus*).

The vertebral formula is:—7 cervical, 18 dorsal, 5 lumbar, 6 sacral. Of the caudal vertebræ only four are preserved. The pleurapophysial part of the transverse process extends forwards in the third cervical, and underlaps that of the second: the corresponding part of the transverse process progressively expands in the succeeding vertebræ to the sixth, where it forms a broad hatchet-shaped plate of bone directed downwards and a little outwards. In the seventh cervical the transverse process consists of a diapophysis only and is therefore im-

perforate. Eight pairs of ribs directly join the sternum, which consists of seven bones, with the xiphoid cartilage. The transverse processes of the last two lumbar and first sacral vertebræ are articulated to one another. The upper costa of the scapula has a wide and deep notch. The femur has a third trochanter.

Presented by Sir Stamford Raffles, P.Z.S.

2867. The skull of the Malayan Tapir (*Tapirus indicus*).

The paroccipitals are compressed and slightly incurved: they are strengthened by a long post-tympanic process, developed from the squamosal and articulated to the fore part of the base of the paroccipital, so as to circumscribe a space occupied by the true mastoid, which is confluent with the petrosal. One or two vacuities are left in this space for the exit of veins. The post-glenoid process is much developed. The base of the pterygoid process is perforated lengthwise by the ectocarotid: the apex is slightly recurved: it unites with the palatine by a squamous suture. The entopterygoids are thin, small, curved lamellæ applied to the inner side of the base of the pterygoid processes, and uniting with each other below, and clear of, the presphenoid. The major part of the palatine enters into the formation of the large oblique hinder aperture of the nasal passages: the smaller anterior division completes the bony palate which terminates behind between the first and second true molar. The last molars have not emerged from their formative alveoli. The lacrymal canal commences by two distinct orifices. The bases of the nasal bones are deeply grooved, and articulate with the frontals parallel with the back part of the orbit. There is no superorbital foramen or canal. The premaxillaries terminate behind at a considerable distance from the elevated nasals.

Presented by Sir Stamford Raffles, P.Z.S.

The following, to No. 2878 inclusive, are parts of the same skeleton of the Malayan Tapir (*Tapirus indicus*):—

Presented by Sir Stamford Raffles, P.Z.S.

2868. The atlas.

The base of the transverse process is twice perforated by the vertebral artery, the anterior perforation opening upon the groove which leads to the foramen in the neural arch common to the vertebral artery and first spinal nerve.

2869. An anterior dorsal vertebra.

The base of the neural arch is perforated on each side by the spinal nerve. The neural spine is strong and of considerable length. The fore part of the centrum is convex, the hind part concave.

2870. A left dorsal rib.

2871. The sacrum.

It includes five vertebræ, but only the first two afford articular surfaces for the ilium. The anterior vertebra shows the supplementary articular surfaces at the fore part of the transverse processes.

2872. The right scapula.

2873. The right humerus.

The intercondyloid space is perforated.

2874. The right radius and ulna.

They are partially anchylosed at their distal ends.

2875. The ossa innominata.

They are partially anchylosed at the pubic symphysis. The ilia are oblong quadrate plates, with the upper and hinder angles developed to form the articulations with the sacrum.

2876. The right femur.

The medullary artery enters the shaft below the small trochanter, and runs obliquely downwards.

2877. The right tibia.

2878. The right fibula.

2879. The skull of an American Tapir (*Tapirus americanus*).

The superoccipital is narrower and more deeply excavated than in the Malayan Tapir: a smaller proportion of the petromastoid is visible between the exoccipital and squamosal: the frontals are less expanded and less elevated above the nasals. In this skull the last molars are still concealed in their formative sockets.

Hunterian.

2880. The skull of an American Tapir (*Tapirus americanus*).

The outer alveolar wall has been removed from the right side of both upper and lower jaws. The last molar tooth is protruded, but not fully developed. The last premolar is in place.

Purchased.

2881. The mutilated skull of an American Tapir (*Tapirus americanus*).

There are five molars in place on each side of the upper jaw, and four molars on each side of the lower jaw; in both of which the last is the first of the true molar series, and the penultimate is the last of the deciduous series. The germ of the last premolar is exposed above the last deciduous molar on the left side of the upper jaw. The cranial cavity being laid open shows the large and well-defined rhinencephalic fossa and the vacuities on each side the basi-occipital which were occupied by the petromastoid. The crowns of the upper canines are beginning to protrude from their sockets: those of the lower jaw are more advanced.

Purchased.

The following, to No. 2932 inclusive, are parts of the same skeleton of an American Tapir:—

Purchased.

2882. The right radius and ulna.

Their distal epiphyses have coalesced with each other, but not with their respective shafts.

2883. The left scaphoides.

2884. The left lunare.

2885. The left cuneiforme.

2886. The left pisiforme.

2887. The left os magnum.

2888. The left unciforme.

2889. The right lunare.

2890. The right cuneiforme.

2891. The right pisiforme.

2892. The right os magnum.

2893. The right unciforme.

2894. The innermost metacarpal.

It answers to the second in the pentadactyle foot.

2895. The second metacarpal.

It answers to the third, or digitus medius, in the pentadactyle foot.

2896. The third metacarpal.

It answers to the fourth in the pentadactyle foot.

2897. The outermost metacarpal.

It answers to the fifth in the pentadactyle foot.

2898. The proximal phalanx of the innermost or index digit.

2899. The middle phalanx of the index digit.

2900. The ungual phalanx of the index digit.

2901. The proximal phalanx of the second or medius digit.

2902. The middle phalanx of the medius digit.

2903. The ungual phalanx of the medius digit.

2904. The proximal phalanx of the third or annularis digit.

2905. The middle phalanx of the annularis digit.

2906. The ungual phalanx of the annularis digit.

2907. The proximal phalanx of the outermost or minimus digit.

2908. The middle phalanx of the minimus digit.

2909. The ungual phalanx of the minimus digit.

2910. The left femur.

The epiphyses have not coalesced with the shaft; the position and course of the medullary artery is as in the Malayan Tapir.

2911. The left patella.

2912. The left tibia.

2913. The left fibula.

2914. The left astragalus.

Its anterior articular surface is divided into two very unequal facets, as in other hoofed quadrupeds with the hind toes in uneven number.

2915. The left calcaneum.

2916. The left naviculare.

2917. The left entocuneiforme.

2918. The left ectocuneiforme.

2919. The left cuboides.

2920. The metatarsal of the innermost toe.

It answers to the second of the pentadactyle foot.

2921. The metatarsal of the middle toe.

2922. The metatarsal of the outermost toe.

It answers to the fourth of the pentadactyle foot.

2923. The proximal phalanx of the innermost toe.

2924. The second phalanx of the innermost toe.

2925. The ungual phalanx of the innermost toe.

2926. The proximal phalanx of the middle toe.

Its proximal epiphysis has not united with the shaft.

2927. The second phalanx of the middle toe.

2928. The distal phalanx of the middle toe.

2929. The proximal phalanx of the outer toe.

2930. The middle phalanx of the outer toe.

2931. The ungual phalanx of the outer toe.

2932. The right femur vertically and longitudinally bisected.

The canal for the medullary artery, which commences anterior to the small trochanter, extends downwards to open into a small medullary cavity at the middle of the shaft of the bone.

Genus *Rhinoceros.*

Dental formula :— $i\,\frac{2-2}{2-2},\ p\,\frac{4-4}{4-4},\ m\,\frac{3-3}{3-3}=36.$

Note.—The incisors are rudimental, and are absorbed in the African Rhinoceroses with two horns, one or both of which horns attain a great size. When the incisors are developed, the median pair is the largest in the upper jaw and the smallest in the lower jaw, and the small incisors are commonly lost early in both jaws. This is the case likewise with the first premolar in both jaws, which is disproportionately small.

2933. The skeleton of a Sumatran Rhinoceros (*Rhinoceros sumatrensis*).

The vertebral formula is :—7 cervical, 19 dorsal, 3 lumbar, 4 sacral, and 22 caudal. It has acquired the permanent dentition, and retains three premolars and three true molars on each side of both jaws. The epiphyses of the long bones have coalesced with their respective shafts. The pleurapophyses, from the fourth to the sixth cervical vertebræ inclusive, have the form of broad subquadrate plates : in the seventh the diapophysis only is developed, and the transverse process is consequently imperforate. The spine of this vertebra suddenly acquires great increase of length, which continues more gradually to the second and third dorsals, beyond which the spines quickly shorten, but gain in antero-posterior extent to the eleventh dorsal, beyond which they continue of the same size, shape and inclination to the lumbar region. The ribs are slender in proportion to their length. The sternum and sternal ribs are wanting in the present skeleton.

Presented by Sir Stamford Raffles, P.Z.S.

2934. The cranium of a male Sumatran Rhinoceros (*Rhinoceros sumatrensis*).

The right incisor is wanting; the molar series consists of *p* 4—4, *m* 3—3. The present cranium offers no indication of the short hinder horn in this two-horned species. A smaller

proportion of the palatine bones enters into the formation of the bony palate than in the Tapir; they chiefly form the sides of the extensive oblong hinder aperture of the nasal passages, the anterior boundary of which is opposite the first true molars. The pterygoid processes are perforated at their base, lengthwise, by the ectocarotid arteries. The nasofrontal suture is in advance of the orbits, and is shaped like the letter V. The postglenoid process is produced into a long subtrihedral, obtuse process: the post-tympanic process takes the place of the true mastoid, and is here a strong quadrate process applied to the base of the paroccipital. The interspace between the post-tympanic process and the exoccipital gives exit to a cranial vein, but does not expose any part of the true mastoid. The orbits are very obscurely marked off from the temporal fossæ: there is no postorbital process, and there is no superorbital foramen. The lacrymal canal commences by two apertures defended by a rough protuberance of the lacrymal bone. There is a well-developed pit for the origin of the inferior oblique. The premaxillaries are small and do not join the nasals.

Presented by Sir Stamford Raffles, P.Z.S.

2935. The skull of a male Sumatran Rhinoceros (*Rhinoceros sumatrensis*).

The crown of the last true molar is beginning to appear above the formative socket. The fangs of the first premolar may be seen in the upper jaw. The left premaxillary retains the small incisor behind the larger one. The frontal bones show the rough surface for the hinder horn. The lacrymal protuberance has an accessory ossicle. The three processes, viz. paroccipital, post-tympanic, and postglenoid, are well displayed in this skull.

Presented by Sir Stamford Raffles, P.Z.S.

2936. The skull of a young Sumatran Rhinoceros (*Rhinoceros sumatrensis*).

The premaxillary bones and the portions of the nasal bones that have supported the anterior horn are wanting. The molars in place are the four deciduous and the first and second true molars on each side: the second deciduous molars have been artificially removed, to expose the germ of the corresponding premolar in its formative alveolus. The permanent incisors are beginning to appear in the lower jaw.

Presented by Sir Joseph Banks, P.R.S.

2937. The left moiety of a vertically and longitudinally bisected cranium of a Sumatran Rhinoceros (*Rhinoceros sumatrensis*).

It shows the extension of the air-cells as far back as the base of the superoccipital ridge. The postglenoid process equals in length the paroccipital, and is much thicker. The post-tympanic, situated between these, is shorter and bent forwards: there is the outlet of a venous foramen between its base and the exoccipital. There is a minute second incisor behind the socket of the larger and normally retained anterior one: the rhinencephalic compartment is large and well defined. The bones of the cranium are numbered on coloured labels corresponding with the Table of Synonyms.

Presented by Sir Stamford Raffles, P.Z.S.

2938. The right moiety of the same cranium.

A part of the upper maxillary bone has been removed to show the germ of the fourth premolar above the fourth milk-molar, which has not been shed: the germ of the last true molar is similarly displayed.

Presented by Sir Stamford Raffles, P.Z.S.

2939. The lower jaw of the same skull.

The germ of the last premolar is exposed beneath the last deciduous molar on the right side.

Presented by Sir Stamford Raffles, P.Z.S.

2940. The pelvis of a male Sumatran Rhinoceros (*Rhinoceros sumatrensis*).

The sacrum consists, as in the skeleton, No. 2933, of four vertebræ: the spines of the two middle ones expand at their summit, and are anchylosed at their posterior angles to the ilia. The diapophyses of the first sacral vertebra develope articular surfaces for the anapophyses of the last lumbar.

Presented by Sir Stamford Raffles, P.Z.S.

2941. The skull of an African Rhinoceros (*Rhinoceros bicornis*, Linn.).

The fourth premolars are just coming into place in the upper jaw: the corresponding deciduous molar still remains on the right side of the lower jaw: the small anterior molar, *p* 1, is retained on the left side of the lower jaw: the last true molars are in their formative alveoli in both jaws. The left petrotympanic bone has been removed. The mastoid processes are better developed than in the Sumatran species.

Purchased.

2942. The cranium of a young African Rhinoceros (*Rhinoceros bicornis*).

The deciduous molars, four on each side, are in place, and the summit of the first true molar is beginning to appear. The dried integument and horns remain adhering to the upper surface of the skull. This specimen is called, in the former Osteological Catalogue, "*Rhinoceros Bicornis Sumatrensis*," and is stated to be "the head of the original specimen described and figured by Mr. Bell in the 'Philosophical Transactions,' vol. lxxxiii. pl. ii. *:" but the absence of elongated premaxillaries with incisive teeth or sockets, together with the size and configuration of the molar teeth in place, prove it to belong to an African two-horned species; and, with regard to the plate referred to, it is engraved from a drawing taken in Sumatra from a male specimen the day after it was shot; and it is stated that "There were six molares or grinders on each side of the upper and lower jaw, becoming gradually larger backward, particularly in the upper. Two teeth in the front of each jaw."—Phil. Trans. 1793, vol. lxxxiii. p. 3.

Hunterian.

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* 4to, 1831, p. 118, No. 815.

2943. Most of the bones of the cranium of a very young African Rhinoceros (*Rhinoceros bicornis*).

The crowns of the second and third deciduous molars are beginning to protrude from their formative alveoli. The alisphenoids are connate with the basisphenoid, and the orbitosphenoids with the presphenoid. The pterygoid processes developed from the alisphenoids are perforated at their base by the ectocarotids.

Purchased.

2944. The lower jaw of the same fœtal or very young African Rhinoceros.

The dried gum which covered the anterior end of the bone has been removed, to expose the four rudimental incisors, two on each side of the symphysis, the outer one being the largest.

Purchased.

The following, to No. 2958 inclusive, are parts of the same skeleton of the African Rhinoceros (*Rhinoceros bicornis*) :—

Hunterian.

2945. The atlas.

The transverse processes are large, horizontally flattened, quadrate plates: the left one is perforated, the right notched, by the vertebral artery, which afterwards perforates the neural arch. An anterior notch indicates the original division between the bases of the neurapophyses behind which the hypapophysis developes a compressed process.

2946. The axis.

The transverse process is moderately long, slender, and perforated at its base; beyond which the articular surfaces for the atlas extend outwards on each side. A rough ridge is developed from each side of the summit of the neural spine.

2947. The fifth cervical vertebra.

The pleurapophysis extends downwards and a little outwards, expanding into a broad subquadrate plate: the diapophysis is thicker, shorter, and more obtuse than in the axis, and the perforation for the vertebral artery is considerably larger: there is a metapophysial tubercle exterior to the prozygapophysis. The neural spine is slender and simple. The centrum presents an articular ball in front and a corresponding cup behind.

2948. An anterior dorsal vertebra.

It is remarkable for the great length and terminal expansion of the neural spine. There are three costal articular surfaces on each side those of the centrum, which retains the form of the cup and ball.

2949. An anterior dorsal vertebra.

A strong metapophysial ridge rises between the diapophysis and zygapophysis: the groove for the nerve is almost converted into a foramen on the right side.

2950. One of the ribs of the right side. One of the ribs of the left side.

These are slender in proportion to their length.

2951. The left humerus.

It is remarkable for the strength of the tuberosities and deltoid ridge, and for the smooth basal surfaces between the tuberosities and on the outside of the external one. The medullary artery enters the back part of the bone and proceeds obliquely forwards and downwards.

2952. The radius.

The surface for the ulna extends along the back part of the ridge bounding that for the humerus.

2953. The ulna.

The two bones interlock at their distal end by reciprocally adapted cavities and tuberosities.

2954. The right femur.

The head is impressed by a deep semicircular pit at its margin. Ossification has extended along the ligament from the great trochanter to the third trochanter. The rotular surface is distinct from those on the condyles.

2955. The right tibia. 2956. The right fibula.

2957. The bones of the fore-foot, with the dried integument and hoofs.

2958. The dried integument and hoofs, with the ungual phalanges, of the hind foot.

2959. The germ of a penultimate molar, right side, upper jaw, of the *Rhinoceros simus*. *Presented by Wm. J. Burchell, Esq., F.L.S.*

2960. The fourth deciduous molar, right side, upper jaw, of the *Rhinoceros simus.*

It is supported by four fangs, the two inner ones being confluent at their base. The crown is much worn, and the anterior fold of enamel is reduced to an island.

Presented by Wm. J. Burchell, Esq., F.L.S.

2961. The first true molar, left side, lower jaw, of an African Rhinoceros.

The crown is much worn, and supported on two long fangs.

Hunterian.

2962. The horns of an African Rhinoceros (*Rhinoceros bicornis*).

Presented by Henry Salt, Esq.

2963. The horns of an older Rhinoceros (*Rhinoceros bicornis*).

Presented by Henry Salt, Esq.

2964. The horns of an African Rhinoceros (*Rhinoceros simus*).

In this species the front horn is more than double the length of the hinder one.

Presented by Sir Joseph Banks, P.R.S.

2965. The horns of an African Rhinoceros.

The front horn, which is more than double the length of the hinder one, is inclined forwards through the greater part of its extent, the extremity being slightly bent back.

Presented by Henry Salt, Esq.

2966. The horns of a young *Rhinoceros simus.*

The length of the front horn is ten inches; its basal circumference fifteen inches.

Presented by Wm. J. Burchell, Esq., F.L.S.

2967. The horns of an older *Rhinoceros simus.* *Purchased.*

2968. The horns of a full-grown *Rhinoceros simus.*

The length of the front horn is forty inches; its basal circumference is twenty-six inches.

Presented by Wm. J. Burchell, Esq., F.L.S.

2969. The skull of the Indian Rhinoceros (*Rhinoceros indicus*, Cuv.; *Rh. unicornis*, Linn.).

The permanent molars are in place. The first and third premolars are wanting on the right side, and all the premolars, with the last true molars, have been removed from the left side of the upper jaw. The series is complete in the lower jaw, except the first small grinder,

of which there is no trace of the socket. The two incisors of the upper jaw and the corresponding large outer incisors of the lower jaw are preserved: the post-tympanic process is much less developed than in the Sumatran Rhinoceros.

Hunterian.

2970. The skull of a young Indian Rhinoceros (*Rhinoceros indicus*), wanting the premaxillary bones and most of the molar teeth.

In the upper jaw the first small grinders are preserved, and the germs of the second, third and fourth premolars may be seen in their formative sockets: in the lower jaw the summits of the large external incisors are beginning to protrude, and the germs of the second, third and fourth premolars are exposed as in the upper jaw. The first true molar remains in the left ramus.

Hunterian.

2971. The skull of the Indian Rhinoceros (*Rhinoceros indicus*).

The permanent dentition is complete, save the first small premolar, which has been broken away from the left side of the upper jaw, and no trace of either this tooth or its socket remains in the lower jaw, in which the two small and middle incisors are preserved, with the two large outer ones.

Purchased.

2972. The lower jaw of an Indian Rhinoceros (*Rhinoceros indicus*).

It retains the small anterior grinders. The third deciduous molar, on the right side, has been removed, to show the germ of the permanent molar. The last true molars are still in their formative alveoli: the points of the great external incisors are beginning to protrude.

Purchased.

2973. The skull, wanting the premaxillaries, of a very young Indian Rhinoceros (*Rhinoceros indicus*).

The second and third deciduous molars are in place in both jaws, and the crown of the fourth is just appearing above its formative socket. The germ of the small tooth in advance of the second deciduous molar is at a similar stage of growth, which would seem to indicate that it is the first of the permanent series: it has no successor. Traces of the sockets of the rudimental deciduous incisors may be seen on the inner sides of the sockets of the large permanent incisors. The elements of the occipital bone are ununited. The post-tympanic process, which takes the place of the mastoid, touches the postglenoid process by its extremity, and circumscribes the meatus auditorius externus. The petrotympanic bones, being loose, have been lost. The superoccipital developes the whole of the crest so called. There is no distinct interparietal. The transverse frontonasal suture is parallel with the fore part of the orbit. The base of the pterygoid process is perforated by the ectocarotid. The entopterygoid, which swells into a tuberosity at its distal end, has been removed on the left side to show the palatopterygoid suture, which it overlaps. The foramen ovale is bounded by the

basisphenoid, alisphenoid, and orbitosphenoid. The bones are numbered on coloured labels according to the TABLE OF SYNONYMS.

Presented by Joseph H. Green, Esq., F.R.S.

2974. The right maxillary, nasal, malar, and lacrymal bones of a very young or fœtal Indian Rhinoceros (*Rhinoceros indicus*).

The second and third deciduous molars have begun to protrude from their formative sockets, but their summits are unworn: the germ of the smaller molar anterior to these may be seen in its formative socket, and in front of this is a minute, simple, conical, obtuse tooth, placed like a canine close to the sutural surface which unites with the premaxillary ('Odontography,' pl. 138. fig. 13 *c*, p. 592).

Presented by Prof. Owen, F.R.S.

The following, to No. 3074 inclusive, are parts of the same skeleton of a young female Indian Rhinoceros (*Rhinoceros indicus*):—

Purchased.

2975. The cranium.

The calvarium has been taken off, exhibiting the numerous and large air-cavities in the neural spines of the cranial vertebræ. The bones forming the expanded neural spines of the cranial vertebræ are so curved, that the summit of the superoccipital bone, and the centre of the nasals, form the two pillars from which are suspended the parietals and frontals, forming an inverted arch. The highest point of the nasals shows a flattening of about half an inch square. From this point the nasals curve downwards, ending pointedly, at three inches distant. The petrotympanic is a distinct bone, and has been disarticulated on the right side from the neighbouring ones. The premaxillaries have been broken off. The articulation between the basi- and pre-sphenoids still remains. The ectocarotid canals, postglenoid, post-tympanic and paroccipital processes, are present, as in the other skulls of Rhinoceros.

The first small premolar is retained with the second and third deciduous molars, which are much worn; the fourth deciduous molar is likewise present, but has not been much used. The first true molar has come into place, and the edges of its crown are slightly abraded: the second true molar is in its formative cavity, almost ready for use.

2976. The lower jaw.

There is a small hole behind the symphysis, extending for some distance into the bone. The first small premolar is in place, and is slightly used; the second and third deciduous molars are more worn; the fourth deciduous molar is not much worn. The first true molar is in its place, with the crown but little abraded; the second and third true molars are in their formative sockets.

2977. The atlas.

The hypapophysis developes a process from the lower part of the anterior surface. The neural arch is perforated transversely by the vertebral artery.

2978. The axis.

The centrum supports a simple diapophysis, inclining downwards and backwards. The neural spine is thick, short, tuberculated, and divided by a deep and broad groove into two: the upper part of the spine is prolonged obliquely upwards, giving the whole a trifid character.

2979. The third cervical vertebra.

The pleurapophysis is inclined downwards and backwards, expanding into a broad plate.

2980. The fourth, fifth and sixth cervical vertebræ of the same Rhinoceros.

The pleurapophysial plate increases in size to the sixth vertebra. The diapophysial portion of the transverse process bends backwards and upwards.

2981. The seventh cervical vertebra.

The neural spine, which has been progressively increasing in length from the third vertebra, now becomes long and pointed. The transverse process is a simple diapophysis. The sutures are still persistent, dividing the centrum from the neural arch and diapophyses.

2982. The nineteen dorsal vertebræ.

A metapophysis is developed in the fourth dorsal from the back part of the diapophysis; it continues throughout the series, and becomes distinct from the diapophysis in the sixteenth dorsal. The first dorsal spine is almost vertical; the third is the longest; they then decrease to the tenth, from which their length or height does not exceed their antero-posterior extent, until the sixteenth, when they again lengthen.

2983. The three lumbar vertebræ of the same Rhinoceros.

The diapophysis appears suddenly in the first; it becomes shorter in the second; and still more so in the third, in which it is very strong and broad. The lower edge of the diapophysis of the second lumbar articulates with the upper edge of the diapophysis of the third, and the third articulates in the same manner with the first vertebra of the sacrum. The metapophyses are distinct, and are situated on the anterior zygapophyses in the first two lumbars: in the last they have become rudimental, and almost obsolete.

2984. The sacrum of the same Rhinoceros.

This consists of four anchylosed vertebræ. The articular surface for the ilium is formed by the first three. The metapophyses are distinct in the first two. The neural spines are long, strong, and tubercular at the end; the last curves very much backwards. The three interarticular cartilages between these four vertebræ have not yet become confluent with the surfaces of the adjacent bones.

2985. The first pair of ribs.

The tubercle is almost as large as the head, and its articular surface is of great size.

2986. The second pair of ribs.

Both this and the first pair are flat, very slightly curved bones, becoming expanded distally, and presenting no grooved inferior or posterior border.

2987. The third pair of ribs.

The inferior border is slightly grooved.

2988. The fourth pair of ribs.

2989. The fifth pair of ribs.

2990. The sixth pair of ribs.

2991. The seventh pair of ribs.

2992. The eighth pair of ribs.

2993. The ninth pair of ribs.

2994. The tenth pair of ribs.

The length of the rib, from the tubercle, is 2 feet 8 inches.

2995. The eleventh pair of ribs.

The length of the rib, from the tubercle, is 2 feet 9½ inches.

2996. The twelfth pair of ribs.

The length of the rib, from the tubercle, is 2 feet 10 inches. This is the longest thoracic rib.

2997. The thirteenth pair of ribs.

2998. The fourteenth pair of ribs.

2999. The fifteenth pair of ribs.

3000. The sixteenth pair of ribs.

3001. The seventeenth pair of ribs.

3002. The eighteenth pair of ribs.

3003. The nineteenth pair of ribs.

The head and tubercle of this last rib have their articular surfaces almost confluent, and the thickness of the rib diminishes towards its distal end, which contrasts with the flat, expanded end of the first rib. Its length is 1 foot 4 inches.

3004. The first seven caudal vertebræ.

The seventh is the last which has a neural canal.

3005. The right scapula.

3006. The left scapula.

3007. The right humerus.

3008. The left humerus.

The medullary artery enters the posterior surface of the shaft between its middle and lower thirds, and inclines downwards. Both upper and lower epiphyses are united to the shaft.

3009. The shaft of the right radius.

3010. The lower epiphysis of the right radius.

3011. The shaft of the right ulna.

3012. The lower epiphysis of the right ulna.

3013. The shaft of the left radius.

3014. The lower epiphysis of the left radius.

3015. The shaft of the left ulna.

3016. The lower epiphysis of the left ulna.

3017. The right scaphoides.

3018. The right lunare.

3019. The right cuneiforme.

3020. The right unciforme.

3021. The right os magnum.

3022. The right os trapezoides.

3023. The right innermost or radial metacarpal bone, with its separated lower epiphysis.

It answers to the second or 'index' metacarpal of the pentadactyle foot.

3024. The right middle metacarpal, with its separated lower epiphysis.

It answers to that of the third toe, or 'medius,' in the pentadactyle foot.

3025. The right outer or ulnar metacarpal, with its separated lower epiphysis.

It answers to that of the fourth toe, or 'annularis,' in the pentadactyle foot.

3026. The left scaphoides.

3027. The left lunare.

3028. The left cuneiforme.

3029. The left trapezium.

3030. The left trapezoides.

3031. The left os magnum.

3032. The left os unciforme.

3033. The left innermost or radial metacarpal, with its separated lower epiphysis.

3034. The left middle metacarpal, with its separated lower epiphysis.

3035. The left outermost or ulnar metacarpal, with its separated lower epiphysis.

3036. The right os innominatum.

3037. The left os innominatum.

3038. The shaft of the right femur.

The medullary canal commences at the back part in the upper half of the shaft, and inclines forwards and downwards. The third trochanter is a remarkable feature, from its great size and forward curvature.

3039. The epiphysial head of the same femur.

It is deeply impressed by the ligamentum teres.

3040. The epiphysial trochanter major of the same femur.

3041. The lower epiphysis of the same femur.

3042. The shaft of the left femur.

The medullary canal commences near the middle of the inner border of the shaft, and inclines obliquely upwards. The canal of another artery is seen rather above the middle of the posterior surface of the shaft, and runs downwards.

3043. The epiphysial head of the same femur.

3044. The epiphysial trochanter major of the same femur.

3045. The lower epiphysis of the same femur.

The inner wall of the trochlear surface for the patella is thicker, more prominent, and is prolonged further up the shaft of the femur than the outer wall is; the condyles are nearly of the same length.

3046. The shaft of the right tibia.

3047. The upper epiphysis of the same tibia.

3048. The lower epiphysis of the same tibia.

3049. The right fibula.

3050. The shaft of the left tibia.

3051. The upper epiphysis of the left tibia.

3052. The left fibula.

3053. The right patella.

3054. The left patella.

3055. The right astragalus.

3056. The right calcaneum.

3057. The right cuboides.

3058. The right naviculare.

3059. The right ectocuneiforme, or 'os cuneiforme externum.'

3060. The right mesocuneiforme, or 'os cuneiforme medium.'

3061. The fibular metatarsal of the right leg of the same Rhinoceros, with its lower epiphysis free from the shaft.

3062. The right middle metatarsal, with its separated lower epiphysis.

It answers to the third metatarsal of the pentadactyle foot.

3063. The right innermost or tibial metatarsal, with its separated lower epiphysis.

It answers to the second metatarsal of the pentadactyle foot.

3064. The left astragalus.

3065. The calcaneum.

3066. The left naviculare.

3067. The left mesocuneiforme.

3068. The left ectocuneiforme.

3069. The left cuboides.

3070. The left innermost or tibial metatarsal, with its separated lower epiphysis.

3071. The left middle metatarsal, with its separated lower epiphysis.

3072. The left outermost or fibular metatarsal, with its separated lower epiphysis.

3073. The basihyal.

3074. The stylohyals.

3075. A molar tooth, left side, upper jaw, of the *Rhinoceros indicus.*

The crown is half worn, and the characteristic inflexions of the animal are very well shown.

Presented by Sir Everard Home, Bart., V.P.R.S.

3076. The third deciduous molar, left side, upper jaw, of the *Rhinoceros indicus.*

It is much worn, and is supported by three fangs.

Presented by Sir Everard Home, Bart., V.P.R.S.

3077. The last molar, left side, upper jaw, of the *Rhinoceros indicus.*

The crown has been transversely bisected, and one of the surfaces polished, to show the thickness and characteristic inflexions of the enamel.

Presented by Sir Everard Home, Bart., V.P.R.S.

3078. The horn, with part of the dried integument, of a young *Rhinoceros indicus.*

It has been longitudinally and vertically bisected, and the base of the horn has been detached from the subjacent skin, exposing the close-set minute pores of the bristle-like fibres, the aggregate of which composes the horn.

Hunterian.

The following series exemplifies the progress of growth in the horn of the Indian One-horned Rhinoceros (*Rhinoceros indicus*) :—

3079. The horn of a young Rhinoceros.

It has a basal circumference of ten inches, and measures six inches in length, following the anterior curve.

Hunterian.

3080. The horn of a young Rhinoceros.

It measures six inches and three-quarters in length, and eleven inches and a half in basal circumference.

Hunterian.

3081. The horn of an older Rhinoceros.

It measures six inches and a half in length and fifteen inches in basal circumference.

Hunterian.

3082. The horn of an older Rhinoceros.

It measures eight inches in length and fifteen inches in basal circumference.

Hunterian.

3083. The horn of a similarly aged Rhinoceros.

It measures eight inches in length and fifteen inches in basal circumference.

Hunterian.

3084. The horn, with part of the dried integument, of an older Rhinoceros.

It measures nine inches in length and nineteen inches in basal circumference.

Hunterian.

3085. The horn of a young female Rhinoceros.

It measures eleven inches in length and thirteen inches in basal circumference.

Hunterian.

3086. The horn of a female Rhinoceros.

It measures fifteen inches in length and sixteen inches in basal circumference, and is remarkable for its slenderness and degree of curvature.

Purchased.

3087. The horn of a similarly aged male Rhinoceros.

It measures thirteen inches and a half in length and sixteen inches in basal circumference.

Hunterian.

3088. The horn of a male Rhinoceros.

It measures seventeen inches in length and twenty-three inches in basal circumference.

Hunterian.

3089. The horn of a full-grown male Rhinoceros.

It measures twenty-eight inches in length and twenty-seven inches in basal circumference.

Hunterian.

3090. The horn of an old male Rhinoceros.

It measures thirty-three inches and a half in length and twenty-seven inches in basal circumference.

Hunterian.

3091. The horn of an old male Rhinoceros.

It measures thirty-two inches and a half in length and sixteen inches in basal circumference.

Hunterian.

Genus *Hyrax.*

The following are parts of the same skeleton of the *Hyrax capensis*:—

Purchased.

3092. The cranium.

The last molar tooth has not yet come into place. There is a small incisive socket behind the large incisors. The petrosal has coalesced with the tympanic: the mastoid terminates in a process wedged between the petrotympanic and paroccipital. The zygomatic process of the squamosal is very short, the zygoma being formed almost wholly by the malar, which contributes a portion of the glenoid cavity. The pterygoid process is perforated lengthwise at its base. The hinder half of the palatines enter into the formation of the long oblique hinder

aperture of the nostrils. There is a large interparietal, and the upper half of the superoccipital appears to be detached from the rest. The lacrymal canal commences by two foramina, which are defended by a process. The maxillary forms the floor of the orbit, as in the Rhinoceros and Tapir: but the premaxillaries join the nasals.

3093. The lower jaw.

It is remarkable for the expanse of the ascending ramus. The coronoid process is perforated lengthwise at its base. The three divisions of the crown of the lower incisors have been worn down to their common base.

3094. The atlas.

The transverse process is perforated vertically at its fore part by the vertebral artery, which afterwards perforates the neural arch. The hypapophysis developes a short process.

3095. The dentata.

The simple transverse process is perforated at its base for the vertebral artery, and the neural arch is perforated on each side by the second cervical nerve.

3096. The five other cervical vertebræ.

The pleurapophysial part of the transverse process is much expanded in the third to the sixth inclusive: it is wanting on the left side of the seventh vertebra, but is present as a distinct element, or rudimental cervical rib, on the right side, where it completes the foramen for the vertebral artery.

3097. The twenty-two dorsal vertebræ.

The spines incline towards the thirteenth, which is vertical, and indicates the centre of motion of that part of the trunk. In their forms and proportions the spines resemble those of the Rhinoceros. Seven pairs of ribs directly join the sternum, which consists of six bones. The metapophysis commences on the third dorsal, and attains the outside of the zygapophysis on the fifteenth: it exceeds the diapophysis in length in all the posterior dorsals.

3098. The eight lumbar vertebræ.

In these the diapophyses suddenly acquire great breadth, and gradually increase in length to the last lumbar: the metapophyses are continued throughout the series. No anapophyses are developed.

3099. The sacral and caudal vertebræ.

They are eleven in number. The first two afford the articular surfaces for the ossa innominata: any other distinction between the sacrum and coccyx is artificial.

3100. The right scapula.

It has no acromion.

3101. The right humerus.

The proximal epiphysis is still ununited. The intercondyloid space is widely perforated.

3102. The bones of the right fore-arm and fore-foot.

There is no vestige of a pollex. The four digits answer to the second, third, fourth and fifth of the pentadactyle foot.

3103. The left scapula.

3104. The left humerus.

3105. The bones of the left fore-arm and fore-foot.

The trapezium is here preserved.

3106. The right os innominatum.

3107. The right femur.

The epiphysis is distinct at both ends: there is a rudiment of a third trochanter: the medullary artery enters near the small trochanter.

3108. The bones of the left leg and hind foot.

These resemble those in the Rhinoceros and Tapir, the toes being reduced to the three middle ones in the pentadactyle foot.

3109. The left os innominatum.

3110. The left femur.

3111. The bones of the left leg and hind foot.

3112. The left patella.

3113. The skull of the *Hyrax capensis*.

Traces of the suture between the super- and ex-occipitals still remain. A small triangular interparietal is wedged between the back part of the parietals. The last molar has partly emerged from its formative socket in both jaws.

Purchased.

3114. A mutilated cranium of a young female *Hyrax capensis*.

The four deciduous molars and first true molar are in place on each side: the second true molar is partly extricated from its socket. The crowns of the permanent incisors are exposed above the deciduous ones: they are lodged in the premaxillaries.

Presented by the Zoological Society of London.

3115. The lower jaw of the same Hyrax.

The outer alveolar wall has been removed from the right ramus, so as to expose the germs of the two permanent canines, of the second true molar, and the formative alveolus of the premolar beneath the third deciduous molar.

The following are parts of the skeleton of a young *Hyrax arboreus*:—

Presented by the Zoological Society of London.

3116. The mutilated cranium.

The deciduous incisors, the four deciduous molars, and the first permanent molar on each side, are in place: the crown of the permanent incisor is exposed on the right side. The ascending process of the malar bone articulates with the postorbital process which is formed by both the parietal and frontal bones. There is no interparietal. The tympanic, which forms the bulla ossea at the basis cranii, has not coalesced with the petrosal. The mastoid has coalesced with the squamosal. The elements of the occipital bone are still ununited.

3117. The lower jaw.

The deciduous incisors have the crown deeply divided into three processes, like a trident.

3118. The atlas.

The hypapophysis is still distinct.

3119. The dentata.

The centrum of the atlas, which forms the odontoid process, is still distinct.

3120. The five other cervical vertebræ.

3121. The twenty-one dorsal vertebræ.

3122. The seven lumbar vertebræ.

3123. The sacral and caudal vertebræ.

They are fourteen in number: of these the first seven have transverse processes, and the first three afford the articular surfaces for the ossa innominata.

3124. The sternum, with the attached cartilages of the ribs.

The sternum consists of six bones, and eight pairs of costal cartilages directly articulated therewith.

3125. The right scapula.

The coracoid is a distinct bone.

3126. The right humerus.

The proximal epiphysis is divided between the head and the great tuberosity.

3127. The right radius.

The epiphyses of both ends are distinct.

3128. The right ulna.

The proximal epiphysis forms the olecranon.

3129. The ossa innominata.

The pubis and ischium are ununited at the acetabulum, and show the proportions which they respectively contribute to that cavity.

3130. The right femur.

The head and great trochanter are formed by distinct epiphyses.

3131. The right tibia.

The epiphyses are ununited at both extremities.

3132. The left tibia.

Genus *Equus*.

3133. The skeleton of a Horse (*Equus Caballus*).

The vertebral formula is :—7 cervical, 19 dorsal, 5 lumbar, 5 sacral, and 17 caudal. Eight pairs of ribs directly join the sternum, which consists of seven bones and an ensiform cartilage. The neural arches of the last five cervical vertebræ expand above into flattened, subquadrate, horizontal plates of bone, with a rough tubercle in place of a spine: the zygapophyses are unusually large. The perforated transverse process sends a pleurapophysis downwards and forwards, and a diapophysis backwards and outwards, in the third to the sixth cervical inclusive: in the seventh the diapophysial part alone is developed, and is imperforate. The spinous processes suddenly and considerably increase in length in the first three dorsals, and attain their greatest length in the fifth and sixth, after which they gradually shorten to the thirteenth, and continue of the same length to the last lumbar. The metapophysis, commencing as a tuberosity above the diapophysis, passes gradually from that part to the outer side of the prozygapophysis, which it finally attains in the seventeenth dorsal vertebra, and continues in the same place throughout the lumbar series. There are no anapophyses. The lumbar diapophyses are long, broad, and in close juxtaposition; the last presents an articular concavity adapted to a corresponding convexity on the fore part of the diapophysis of the first sacral. The spine of the scapula has no acromion. The ulna, represented by its olecranal extremity, is confluent with the radius. The os magnum in the second series of carpal bones is remarkable for its great breadth, corresponding to the enormous development of the metacarpal bone of the middle toe, which forms the chief part of the foot. Splint-shaped rudiments of the metacarpals, answering to the second and fourth of the pentadactyle foot, are articulated respectively to the trapezoides and the reduced homologue of the unciforme. The femur is characterized by a third trochanter developed from the outer part of the shaft before the great trochanter. There is a splint-shaped rudiment of the proximal end of the fibula, but not any rudiment of the distal end. The external cuneiforme is the largest of the second series of tarsals, being in proportion to the metatarsal of the large middle digit, which it mainly supports. The diminished cuboides articulates partly with this, partly with the rudiment of the metatarsal corresponding with that of the fourth toe. A similar rudiment of the metatarsal of the toe corresponding with that of the second articulates with a cuneiforme medium—here, however, the innermost of the second series of tarsal bones.

Hunterian.

3134. The skeleton of the dwarf variety of *Equus Caballus*, commonly called the 'Shetland pony.' *Mus. South.*

3135. The skull, with the stylohyals artificially attached, of an aged Horse (*Equus Caballus*).

Here the maxillo-premaxillary sutures, and most of the other sutures of the cranium, have been obliterated. The crowns of the incisors are worn down almost to the obliteration of the 'mark,' which is due to a central inflected fold of enamel and cement.

Hunterian.

3136. The skull of a Horse (*Equus Caballus*).

The maxillo-premaxillary sutures are obliterated.

Hunterian.

3137. The skull of a Mare (*Equus Caballus*).

This is characterized by the rudimental state of the canines, of which that of the right side, upper jaw, is shed, and the socket almost obliterated. If the equine skull be compared with that of the Rhinoceros, the basioccipital will be seen to be narrower and more convex, the sides, in some (Nos. 3133 and 3135, *e.g.*), being separated by an angle from the under surface. The true mastoid intervenes, as a tuberous process, between the post-tympanic and paroccipital processes, clearly indicating the true nature of the post-tympanic in the Rhinoceros; the Tapir shows an intermediate condition of the mastoid between the Rhinoceros and Horse. The latter differs from both the Tapir and Rhinoceros in the outward production of the sharp roof of the orbit and the completion of the bony frame of that cavity behind by the junction of the postorbital process with the zygoma. The temporal fossa, so defined, is small in proportion to the length of the skull: the base of the postorbital process is perforated by a supcrorbital foramen: the lacrymal canal begins by a single foramen. The premaxillaries extend to the nasals, and shut out the maxillaries from the anterior aperture of the nostrils. The chief marks of affinity to other Perissodactyles are seen in the shape, size and formation of the posterior aperture of the nostrils, the major part of which is bounded by the palatine bones, of which only a small portion enters into the formation of the bony palate, which terminates behind opposite the interspace between the penultimate and last molars. A narrow groove divides the palato-pterygoid process from the socket of the last molar, as in the Tapir and Rhinoceros. The pterygoid process has but little antero-posterior extent: its base is perforated by the ectocarotid canal. The entopterygoids are thin plates applied like splints over the inner side of the squamous suture betwecn the pterygoid proccsses of the palatines and alisphenoids. The postglenoid process is less developed than in the Tapir. The eustachian process is long and styliform. There is an anterior condyloid foramen, and a wide 'fissura lacera.' The broad and convex bases of the nasals articulate with the frontals a little behind the anterior boundary of the orbits. The space between the incisors and molars is of greater extent than in the Tapir: a long diastema is not, however, peculiar to the Horse, and, although it allows the application of the bit, that application depends rather upon the general nature of the Horse, and its consequent susceptibility to be broken in, than upon a particular structure which it possesses in common with the Ruminants and some other Herbivora.

Hunterian.

3138. The skull of a Mare (*Equus Caballus*). *Presented by Henry Cline, Esq.*

3139. The skull, vertically and longitudinally bisected, of a Horse (*Equus Caballus*).

The air-cells do not extend further back than the fore part of the frontals above the cranial cavity, and of the basisphenoid beneath. Ossification extends into the base of the ten-

torium and its continuation into the falx. The upper boundary of the rhinencephalic fossa is much developed.

Hunterian.

3140. The right moiety of a vertically bisected cranium, from which the facial part has been removed by a transverse section, of a Horse (*Equus Caballus*).

It shows the ossification which extends into the upper and back part of the tentorium, the venous canal which extends from the lateral sinus to the temporal fossæ, and the septa of the frontal air-cells.

Hunterian.

The following specimens show some of the stages in the development and succession of the teeth of the Horse (*Equus Caballus*) :—

3141. The skull of a Filly or young Mare, with the deciduous teeth.

The rudimentary canines are visible in the lower jaw, not in the upper one. The three normal deciduous molars on each side are preceded by the first rudimental molar in both jaws: this tooth is very minute in the lower jaw. The crown of the first true molar has been exposed on the right side of the upper jaw. The exoccipitals have coalesced with the basioccipital, but not with each other or with the superoccipital. The suture is retained by which the premaxillaries articulate with the maxillaries and the nasals, excluding the maxillaries from the external nostrils.

Presented by Henry Cline, Esq.

3142. The right moiety of the facial part of a vertically bisected skull of a young Mare.

The three deciduous molars and first true molar are in place and use; the second is beginning to appear.

Hunterian.

3143. The skull of a young Horse, showing a similar stage of dentition. *Purchased.*

3144. The skull of a Horse, of more advanced age.

In this the first permanent incisor is in place in both the upper and lower jaws, but the second and third permanent incisors have not displaced their deciduous predecessors. The crowns of the permanent canines are just visible. The first and second functional premolars (*p* 2 & *p* 3) and the first and second true molars (*m* 1 & *m* 2) are in place. The anterior rudimental premolar (*p* 1) remains in the upper jaw, and a remnant of the last deciduous molar is retained on each side of both jaws. The outer alveolar walls have been removed on the right side of the upper jaw, where the crown of the last true molar is exposed in its formative socket.

Purchased.

3145. The right moiety of a vertically bisected skull of a young Horse.

It has not acquired its second and third permanent incisors, the permanent canines, the last premolar, or the last true molar. The remnant of the crown of the last deciduous molar is still retained. The individual bones are numbered, on coloured labels, corresponding to the Table of Synonyms.

Presented by Henry Cline, Esq.

3146. The skull of a Mare, of more advanced age.

In this the deciduous incisors have been shed, and the first and second permanent incisors of both jaws have come into place. The minute deciduous canines are still retained in the lower jaw.

Purchased.

3147. A section of the skull of a Horse, including the molar series of the left side of the upper jaw.

The first rudimental tooth is retained, completing the normal number of four premolars and three true molars. The last premolar, having been the last to be developed, projects further than the rest, probably from its development having been in advance of that of its homotype below.

Hunterian.

3148. The left moiety of the facial part of a longitudinally bisected skull of a Horse, with the permanent series of teeth complete and exposed in their sockets.

The character by which the equine molars may best be distinguished from the teeth of other existing Herbivores corresponding with them in size, is the great length of the tooth before it divides into fangs. This division, indeed, does not begin to take place until much of the crown has been worn away; and thus, except in old Horses, a considerable proportion of the whole molar is implanted in the socket by an undivided base. This is slightly curved in the upper molars.

Hunterian.

3149. The fore part of both upper and lower jaws of a young Mare, showing the deciduous incisors. The excavated summits of the middle permanent incisors are exposed in the upper jaw. *Presented by Bransby B. Cooper, Esq., F.R.S.*

3150. The fore part of the upper jaw of a Horse, of about five years of age, with the permanent incisors and canines, and the inflected fold of enamel still remaining in all the incisors, but most shallow in the mid-incisors, which were first developed and in use. *Presented by Bransby B. Cooper, Esq., F.R.S.*

3151. The fore part of the upper jaw of an older Horse, with the enamel-fold obliterated in the left outer incisor ('corner-nipper,' *i* 3), but not in any of the other incisors. *Presented by Bransby B. Cooper, Esq., F.R.S.*

3152. The fore part of the upper jaw of a Horse, with the cavity of the enamel-fold obliterated in the mid-incisors (*i* 1), but not in the next (*i* 2) or outer (*i* 3) incisors.

This and the foregoing specimen exemplify the varieties which may occur in the obliteration of the 'marks' by which the dealers pronounce on the age of the Horse.

Presented by Bransby B. Cooper, Esq., F.R.S.

3153. The fore part of the lower jaw, including the incisors and recently-protruded canines, of a Horse of five years old.

The incisors show the cavity in the crown called the 'mark,' which is progressively deeper from the first to the third, according to the degree of abrasion of the crown, which corresponds with the order of appearance of these teeth.

Purchased.

3154. The fore part of the under jaw of a Horse, with the cavity of the enamel-fold obliterated in the mid-incisors (*i* 1), but not in the adjoining (*i* 2) or outer (*i* 3) incisors. This condition is held to be characteristic of the Horse at six years old, or thereabouts. *Presented by Bransby B. Cooper, Esq., F.R.S.*

3155. The fore part of the under jaw of a Horse, with the cavity of the enamel-fold obliterated in the middle (*i* 1) and adjoining (*i* 2) but not in the outer (*i* 3) incisors. This condition is held to be characteristic of the Horse at seven years old, or thereabouts. *Presented by Bransby B. Cooper, Esq., F.R.S.*

3156. The fore part of the under jaw of a Horse, with the enamel-fold obliterated in all the incisors, and the apices of the canines obliquely abraded. This shows the Horse to be 'aged,' or past the eighth year.

Presented by Bransby B. Cooper, Esq., F.R.S.

3157. The fore part of both upper and lower jaws of a very old Horse, in which the canines, especially the upper ones, are much worn, the major part of the crown

of the incisors rubbed down, the fangs elongated, and those of the upper jaw much curved to bring the crowns in apposition with the procumbent and horizontal incisors of the lower jaw.

Presented by Bransby B. Cooper, Esq., F.R.S.

The following is the average course of development and succession of the teeth in the *Equus Caballus*:—The summits of the first functional deciduous molar (*d* 2, 'first grinder' of veterinary authors) are usually apparent at birth: the succeeding grinder (*d* 3) sometimes rises a day or two later, sometimes together with the first. Their appearance is speedily followed by that of the first deciduous incisor ('centre nipper' of Veterinarians), which usually cuts the gum between the third and sixth days. The second deciduous incisor appears between the twentieth and fortieth days, and about this time the rudimental grinder (*p* 1) comes into place, and the last deciduous molar (*d* 4) begins to cut the gum. About the sixth month the inferior lateral or third incisors, with the deciduous canine, make their appearance. The minute canine is shed about the time that the contiguous incisor is in place, and is not retained beyond the first year. The upper deciduous canine is shed in the course of the second year. The first true molar (*m* 1) appears between the eleventh and thirteenth months. The second molar follows before the twentieth month. The first functional premolar (*p* 2) displaces the deciduous molar (*d* 2) at from two years to two years and a half old. The first permanent incisor protrudes from the gum at between two years and a half and three years. At the same period, the second, or penultimate premolar (*p* 3), pushes out the penultimate milk-molar (*d* 3), and the penultimate true molar comes into place. The last premolar displaces the last deciduous molar at between three years and a half and four years: the appearance above the gum of the last true molar (*m* 3) is usually somewhat earlier. The second incisor pushes out its deciduous predecessor about the same period. The permanent canine or 'tusk' next follows: its appearance indicates the age of four years, but it sometimes comes earlier. The third, or outer incisor, pushes out the deciduous incisor about the fifth year, but is seldom in full place before the Horse is five years and a half old. Upon the rising of the third permanent incisor, or 'corner nipper' of the Veterinarians, the 'colt' becomes a 'horse,' and the 'filly' a 'mare,' in the language of the horse-dealers.

The following specimens illustrate the form and structure of the teeth of the Horse (*Equus Caballus*):—

3158. The dental series of the right side of the upper jaw of a Horse.

It consists of three incisors, one canine, three premolars, and three true molars. The anterior rudimental premolar has not been preserved. The individual teeth are indicated by their symbols.

Hunterian.

3159. The dental series, with the exception of the rudimental premolar, of the right side of the lower jaw of a Horse. *Hunterian.*

3160. A premolar of the upper jaw, with the last remnant of the crown of the deciduous molar which it was about to displace, of a Horse.

The absorbed surface of the crown is so exactly coadapted to the inequalities of that of the succeeding tooth, as to be firmly attached to it, although a part of the new crown has come into use: here therefore we have an instance of a grinding surface being formed by two teeth projecting from the same socket.

Hunterian.

3161. A transverse section of the lower jaw of the Horse, exposing a molar tooth in its alveolar cavity, and showing the great extent of the crown therein imbedded. *Purchased.*

3162. Portions of two longitudinally bisected incisors of a Horse.

They show the long conical pulp-cavity extending into the crown from the base, and the cavity produced by the inflected fold of the matrix extending in the opposite direction, or from the crown towards the base. A layer of enamel and cement are continued into this cavity, as upon the exterior of the tooth.

Presented by Sir Everard Home, Bart., V.P.R.S.

3163. The left lower canine of a Horse.

The short enamelled crown is convex on the outside: it has two longitudinal impressions on the inside, near the margins of the crown, producing a wavy transverse section on that side.

Hunterian.

3164. The second premolar, left side, upper jaw, of a Horse.

The crown, which has been cut transversely and polished, shows the sinuous folds of enamel surrounding the dentine and inflected into the interior of the crown, with the dentine on one side of the enamel and the thick cement on the other side. The degree of polish corresponds with the degree of density of these different substances.

Hunterian.

3165. The first true molar, right side, upper jaw, similarly prepared, of a Horse.

Hunterian.

3166. The first true molar, left side, upper jaw, of a Horse.

It has been longitudinally bisected, to show the depth of the internal folds of the enamel and cement. A transverse section has been removed from the outer moiety of this tooth.

Hunterian.

3167. A transverse slice from the crown of the large anterior premolar, upper jaw, of a Horse. *Presented by Sir Everard Home, Bart., V.P.R.S.*

3168. A portion of a transverse slice of the corresponding tooth of the lower jaw. *Presented by Sir Everard Home, Bart., V.P.R.S.*

3169. A transverse slice from a middle upper grinder of a Horse. *Presented by Sir Everard Home, Bart., V.P.R.S.*

3170. The moiety of a longitudinally bisected lower molar of a Horse, from the crown of which an oblique section has been removed.

The cut surfaces have been polished, showing the interblending of the three constituents of a compound tooth, viz. the dentine, the enamel, and the cement.

Hunterian.

The following specimens, to No. 3175 inclusive, exemplify malformation or disease, attendant on aberrations in the dentition of the Horse (*Equus Caballus*) :—

3171. Sections of the skull of a Horse, including the dental series of the lower jaw and portions of the upper jaw, including the last molar tooth.

The lower jaw presents the rare anomaly of a supernumerary true molar in each ramus, behind the normal third molar, which is characterized, as usual, by the posterior accessory lobe. The supernumerary pair, having no homotypes in the upper jaw, have played obliquely upon the back part of the third true molars in that jaw, and project so far above the normal series as to have occasioned ulceration and absorption in the opposite part of the upper jaw.

Purchased.

3172. The skull of a Horse, in which the molar teeth of the left side, in consequence of imperfect apposition, arising from slight distortion of the left ramus, have worn each other obliquely to almost trenchant edges, and are unusually protruded from their sockets. *Hunterian.*

3173. The anterior half of a transversely bisected skull of a Horse.

The maxillo-premaxillary sutures have begun to be obliterated at their lower part. The last premolar of the right side of the lower jaw, and its socket, are diseased.

Purchased.

3174. An upper molar of a Horse.

In the former edition of the 'Osteological Catalogue' it is stated, that this tooth had the following inscription, in Mr. Hunter's handwriting, attached to it:—

"A Horse's tooth of the under jaw; had ground out the tooth above it; the wound mortified, and the horse died."—P. 125. No. 870.

Hunterian.

3175. The skull of a Horse.

In this specimen the middle third of the left ramus of the lower jaw has been entirely destroyed by the ulcerative absorption. This would seem to have proceeded with rapidity, since the molars of the corresponding part of the upper jaw have not been protruded beyond their usual position.

Purchased.

The following, to No. 3181 inclusive, are parts of the same skeleton of a Horse (*Equus Caballus*):—

Hunterian.

3176. The atlas.

The anterior articular cavities do not meet below: the diapophysial ridges are much more produced than in the Camel, and bend down, forming large concavities. The vertebral arteries twice pierce the base of each process, which is also perforated by a canal leading to the neural canal, anterior to which the neural arch is perforated on each side. The hypapophysis developes a strong tubercle.

3177. The axis.

The neural spine is a strong but low rugged ridge, which bifurcates posteriorly, and subsides upon the zygapophyses. The diapophyses are short and triangular, with their bases perforated by the vertebral artery. The centrum of the atlas has coalesced with that of the axis to form the 'odontoid process.' A strong ridge on the under part of the centrum leads to the hypapophysis. The posterior articular surface of the centrum is deeply excavated.

3178. The third cervical vertebra.

The pleurapophysis is developed below the arterial canal, and extends forwards, outwards and downwards. The neural spine has subsided to a low rough ridge. The hypapophysial ridge and tubercle are well marked, as are also the anterior convexity and posterior concavity of the centrum. The inner surface of each neurapophysis is pierced by a small canal in the same place and direction as that which transmits the vertebral artery in the Camel; but the vertebral artery traverses the base of the transverse process in the Horse, as in most other mammals.

3179. The three middle lumbar vertebræ.

The anterior end of the centrum is slightly convex, the posterior slightly concave. A metapophysial ridge projects from the outside of each anterior zygapophysis. There is a hyp-

apophysial ridge at the under part of each centrum. The neural spines are moderately long, compressed, but so extended antero-posteriorly, as to touch, or nearly touch, each other. The diapophyses are broad, depressed, and much extended horizontally. An articular surface is developed at the back part of the left diapophysis of the last of these vertebræ. The lumbar nerves escape by deep notches.

3180. The last four lumbar vertebræ.

The antepenultimate articulates with the penultimate vertebra by a pair of joints developed between the opposed bases of the broad diapophyses. Similar, but larger, articular surfaces assist in connecting the penultimate with the last lumbar vertebra, which presents at the back part of its thickened diapophyses still larger articular cavities for corresponding convexities on the fore part of the thickened and shortened diapophyses of the first sacral vertebra.

3181. The sacrum.

It consists of five coalesced vertebræ; but the rough surface for articulation with the ilium is developed exclusively from the first.

3182. The last two lumbar vertebræ and sacrum of a Horse (*Equus Caballus*).

In this specimen the lumbar vertebræ are anchylosed to each other, and the sacrum includes seven anchylosed vertebræ.

Hunterian.

3183. An anterior thoracic vertebral rib of a Horse (*Equus Caballus*). *Hunterian.*

3184. The succeeding rib from the same side of the thorax of the same Horse.

Hunterian.

3185. The right scapula of a Horse.

The suprascapular cartilage is partially ossified and anchylosed to the scapula. The spine is thickened, roughened, reduced, and bent down at its middle part. The acromial angle is low and rudimentary.

Hunterian.

3186. The right humerus of a Horse. *Hunterian.*

3187. The right radius and ulna, coalesced, of a Horse. *Hunterian.*

3188. The right scaphoides of a Horse. *Hunterian.*

3189. The right pisiforme of a Horse. *Hunterian.*

3190. The left os magnum of a Horse. *Hunterian.*

3191. The right unciforme of a Horse. *Hunterian.*

3192. The right metacarpus of a Horse.

There is an ossification of a flexor tendon, like a third splint-bone at the back of the principal metacarpal or 'cannon-bone.' This bone answers to the metacarpal of the middle digit in the pentadactyle foot. Of the two lateral splint-bones the inner bone is a rudimental metacarpal of the second digit, the outer one that of the fourth, the digits which have no representatives in the Horse's fore-foot being those answering to the thumb and the little finger of the human hand. The inner splint-bone is anchylosed to the cannon-bone, which is also diseased at the distal end. The cannon-bone has a single canal for the medullary artery which enters at the back part, at the junction of the upper with the middle third.

Presented by Sir P. de M. Grey Egerton, Bart., M.P.

3193. The proximal phalanx of the principal digit of the Horse.

It answers to that of the middle digit in the pentadactyle foot, and is called the 'great pastern-bone' by Veterinarians.

Presented by Henry Cline, Esq.

3194. The middle and ungual phalanges of the same digit, with the interposed sesamoid bone.

The middle phalanx is called the 'small pastern-bone,' the ungual one the 'coffin-bone,' and the sesamoid is the 'coronet-' or 'nut-bone' of Veterinarians.

Presented by Henry Cline, Esq.

3195. The three phalanges of the digitus medius, forming the chief part of the fore-foot of the Horse.

There are signs of ossific inflammation in each of the bones.

Presented by Henry Cline, Esq.

3196. The two ossa innominata of a Horse. *Hunterian.*

3197. The right femur of a Horse.

It is characterized by the partial division of the great trochanter, and by the addition of a third trochanter from the outer part of the shaft. The medullary artery enters the middle of the shaft at its postero-internal side, and inclines slightly upwards.

Hunterian.

3198. The right tibia of a Horse. *Hunterian.*

3199. The patella of a Horse. *Hunterian.*

3200. The right astragalus of a Horse.

It is characterized by the depth and obliquity of the superior trochlea, and by the extensive and undivided anterior surface, which is almost entirely appropriated by the naviculare.

Hunterian.

3201. The right calcaneum of a Horse. *Hunterian.*

3202. The right naviculare of a Horse. *Hunterian.*

3203. The right ectocuneiforme of a Horse.

This, which is the homotype of the magnum in the carpus, is equally remarkable for its large size, since it supports that metatarsal, answering to the middle one in pentadactyle quadrupeds, which constitutes the chief part of the hind-foot in the Horse.

Hunterian.

3204. The right cuboides. *Hunterian.*

3205. The metatarsal of the middle toe ('cannon-bone'), with the anchylosed rudiments of the metatarsals of the second and fourth toes ('splint-bones') of the left hind-foot of a Horse.

There has been much ossific inflammation where these bones have anchylosed: the ordinary medullary canal of the cannon-bone has been thereby obliterated, and a sinus has been formed which penetrates the outer side of the cannon-bone.

Hunterian.

3206. The bones of the right fore-foot of a Horse, with a double and malformed hoof.

The cannon-bone presents the usual form and disproportionate size, except that its distal epiphysis remains distinct and does not articulate with the whole of the distal extremity of the shaft. A small proportion of the inner surface of this extremity supports a second epiphysis, with which the smaller of the two hoofed digits articulates. The middle and ungual phalanges of the normal hoofed digit are distorted inwards. The splint-bones, or rudiments of the second and fourth digits, extend along five-sixths of the cannon-bone. The outer and larger of the two hoofed digits is shown, by its exclusive articulation with the trochlear epi-

physis of the cannon-bone, to be the homologue of the middle digit. The smaller supernumerary hoofed digit answers to the second or index digit. It is separated from its rudimental metacarpal by a small portion of the shaft of the middle metacarpal. It does not correspond with either of the normally developed digits of the bisulcate or cloven foot.

Purchased.

3207. The bones of the left fore leg and foot of a Pony (*Equus Caballus*).

The trapezoides, cuneiforme, and pisiforme are wanting from the wrist. The two sesamoids are preserved behind the joint of the metacarpal, with the proximal phalanx of the fully-developed digit, and the single sesamoid behind the joint of the middle with the distal phalanx.

Hunterian.

3208. The bones of the left hind leg and foot of the same Pony.

The styliform proximal rudiment of the fibula is wanting. All the bones of the tarsus are preserved, and the sesamoids of the fully-developed digit.

Hunterian.

3209. The hoof of the fore-foot of a Horse.

Part of the sole is broken away.

Hunterian.

3210. The hoof of the hind-foot of a Horse.

It is proportionally narrower than that of the fore-foot.

Hunterian.

3211. The moiety of a longitudinally bisected hoof of a horse. *Hunterian.*

3212. The skeleton of a Quagga (*Equus Quagga*).

The vertebral formula is:—7 cervical, 19 dorsal, 6 lumbar, 5 sacral, and 18 caudal. The last pair of ribs is artificial.

Mus. Brookes.

3213. The skull of a male Quagga (*Equus Quagga*).

It differs from the Horse in the smaller proportional size of the last upper molar, especially of the posterior lobe: the antero-posterior extent of the last lower molar is also relatively less than in the *Equus Caballus*. The posterior notch of the bony palate extends further forwards.

Mus. Brookes.

3214. The skeleton of a Zebra (*Equus Zebra*).

The vertebral formula is:—7 cervical, 18 dorsal, 6 lumbar, 5 sacral, and 17 caudal.

Mus. Brookes.

3215. The lower jaw of a Zebra (*Equus Zebra*).

The rami diverge as they recede from the symphysis, more than in the Quagga, and the coalesced symphysis is longer and narrower.

Presented by Mr. Cross.

3216. The skeleton of an Ass (*Equus Asinus*).

The vertebral formula is:—7 cervical, 18 dorsal, 5 lumbar, 5 sacral: 11 caudal vertebræ are preserved.

Hunterian.

3217. The skull of an Ass (*Equus Asinus*).

The last upper molars are relatively smaller than in the Horse, especially in the size of their posterior lobe, and the same is observable, but in a somewhat less degree, with regard to the last lower molars. The form and extent of the posterior emargination of the bony palate resemble those in the Horse. The lower jaw in this specimen presents a deep and well-marked fossa above the hinder part of the anchylosed symphysis, of which there is no trace in the Horse or Quagga.

Hunterian.

3218. The skull of a young Ass (*Equus Asinus*).

The incisors, canines, last premolars, and last true molars of the permanent series, have not been acquired.

Presented by William Clift, Esq., F.R.S.

3219. The symphysis of the lower jaw of a young Ass.

The two middle permanent and four lateral deciduous incisors are in place. The points of the permanent canines are just visible.

Purchased.

3220. The symphysis of the lower jaw of an old Ass.

The crowns of the incisors are much worn, and the 'mark' nearly obliterated in the intermediate pairs.

Purchased.

3221. The right astragalus of an Ass. *Hunterian.*

3222. The left ectocuneiform bone of an Ass. *Hunterian.*

The following are parts of the same skeleton of a Mule:—

Hunterian.

3223. The atlas.

3224. The axis.

3225. The first dorsal vertebra.

This vertebra is characterized by the large size of the anterior zygapophyses and by the size and position of the articular surfaces for the head and tubercle of the first rib, with the semioval articulation for half the head of the second rib, on each side.

3226. The middle dorsal vertebra.

It has a strong metapophysial ridge above the diapophysis; a very long neural spine; and the base of the neurapophysis is directly perforated by the spinal nerve on each side.

3227. One of the ribs.

3228. A shorter posterior rib.

In this the articular surfaces of the head and tubercle are confluent.

3229. The right scapula.

3230. The proximal phalanx of the large functional digit, or 'great pastern bone,' of the fore foot.

3231. The middle phalanx of the same digit, or 'small pastern bone.'

3232. The ungual phalanx of the same digit, or 'coffin bone.'

3233. The sesamoid of the same digit, or 'nut-bone.'

3234. The left os innominatum.

3235. The proximal phalanx of the large functional digit of the hind foot.

3236. The middle phalanx of the same digit.

3237. The ungual phalanx of the same digit.

The following are parts of the same skeleton of a kind of Mule, called 'Kumrah':—

Presented by the Right Hon. Earl Granville.

3238. The skull.

It has all the essential osteological and dental characters of the genus *Equus*, but the facial part of the skull is unusually short. The alveolar portions of the upper jaw have been diseased, and the teeth are distorted and unequally worn.

3239. Five of the dorsal vertebræ.

In these may be traced the progressive change of position of the metapophysis from the diapophysis in the first vertebra to the zygapophysis in the last.

3240. The last dorsal and first four lumbar vertebræ.

The diapophysis of the dorsal vertebra is short, and supports an articular surface for the last rib. Its homotype in the next vertebra is suddenly elongated, and probably increased by a coalesced or connate rudiment of a lumbar rib. In the last lumbar a posterior articular process is developed from the back part of each diapophysis. In all these vertebræ the centrum shows a hypapophysial ridge.

3241. The last two lumbar vertebræ, the sacrum, and the five anterior caudal vertebræ.

The diapophysial articulations are developed in the lumbar vertebræ as in other equine animals. The sacrum includes five vertebræ. The diapophyses and metapophyses continue to be developed from the caudal vertebræ after the zygapophyses have disappeared.

3242. The right scapula.

3243. The left humerus.

3244. The right radius and ulna, coalesced.

3245. The principal metacarpal and the two rudimental metacarpals of the right fore foot.

3246. The ossa innominata.

The post-pubic depression is more marked than in the ordinary Mule, or the Ass.

3247. The right femur.

It shows the third trochanter and the deep fossa above the external condyle, characteristic of the genus *Equus*.

If the foregoing osteological specimens from the hoofed animals with the hind digits in uneven number be compared together, they will be found to present, notwithstanding the differences of form, proportion and size presented by the Rhinoceros, Hyrax, Tapir and Horse, the following points of agreement, which are the more significative of natural affinity when contrasted with the skeletons of the hoofed animals with digits in even number. Thus, in the odd-toed or 'perissodactyle' Ungulates, the dorso-lumbar vertebræ differ in different species, but are never fewer than twenty-two: the femur has a third trochanter, and the medullary artery does not penetrate the fore part of its shaft. The fore part of the astragalus is divided into two very unequal facets. The os magnum and the digitus medius which it supports is large, in some disproportionately, and the digit is symmetrical: the same applies to the ectocuneiform and the digit it supports in the hind foot. If the species be horned, the horn is single; or if there be two, they are placed on the median line of the head, one behind the other, each being thus a single or odd horn. There is a well-developed post-tympanic process, which is separated by the true mastoid from the paroccipital in the Horse, but unites with the lower part of the paroccipital in the Tapir, and seems to take the place of the mastoid in the Rhinoceros and Hyrax. The hinder half, or a larger proportion, of the palatines enters into the formation of the posterior nares, the oblique aperture of which commences in advance of the last molar, and in most, of the penultimate one. The pterygoid process has a broad and thick base and is perforated lengthwise by the ectocarotid. The crowns of the antepenultimate as well as of the penultimate and last premolars are as complex as those of the molars: that of the last lower milk-molar is bilobed. To these osteological and dental characters may be added some important modifications of internal structure, as *e. g.* the simple form of the stomach and the capacious and sacculated cæcum, equally indicating the mutual affinities of the odd-toed or perissodactyle hoofed quadrupeds, and their claims to be regarded as a natural group of the *Ungulata.* Many extinct genera, *e. g. Lophiodon, Tapirotherium, Palæotherium, Hippotherium, Acerotherium, Macrauchenia, Elasmotherium, Coryphodon,* have been discovered, which once linked together the now broken series of *Perissodactyla,* represented by the existing genera *Rhinoceros, Hyrax, Tapirus,* and *Equus.*

Order ARTIODACTYLA
(*Pachydermes à doigts paires et Ruminans,* Cuv.).

Suborder *NON-RUMINANTIA.*

Family *Suidæ* (Hogs, Wart-hogs, Peccaris).

Genus *Sus.*

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{4-4}{4-4}$, $m\,\frac{3-3}{3-3}=44$.

3248. The skeleton of an Indian Wild Boar (*Sus Scrofa*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 23 caudal (one or two may be wanting at the end of the tail). The fifth and sixth cervical vertebræ are remarkable for the great expanse of the lamelliform, overlapping, and downwardly directed costal

parts of the tranverse processes, and the seventh cervical for the absence of the pleurapophysis and the sudden increase in the length of the neural spine. This is far surpassed by the spines of the anterior dorsal vertebræ; after which those processes progressively decrease in height to the last three dorsals, where they gain in antero-posterior extent: the verticality of the spine of the eleventh dorsal indicates the centre of motion of the trunk. The dorsal neurapophyses are directly perforated by the spinal nerves, and a bar of bone connects the end of the diapophysis with the hind part of the centrum, circumscribing a vertical perforation on each side. The metapophysis commences as a tuberosity upon the diapophysis of the middle dorsal vertebræ, projects forwards midway between the dia- and prozyg-apophyses in the tenth, passes upon the prozygapophysis of the eleventh dorsal, and is continued in that position throughout the lumbar series. There are no anapophyses. The spine of the scapula is most developed at its middle, where it is bent back: there is no acromion. The humerus has an intercondyloid vacuity. The medullary artery of the femur enters the fore part of its upper third and the canal slopes downwards. The innermost digit is not developed on either the fore or hind foot: the symmetrical pair, which are most developed and chiefly serviceable in progression, answer to the third and fourth digits of the pentadactyle foot. There is a supernumerary premolar, or retained deciduous tooth, on the left side of the upper jaw in this specimen.

Presented by Dr. Henderson.

3249. The skull of an Indian Wild Boar (*Sus Scrofa*).

In this is well exemplified the typical dentition of the Diphyodont Mammals, or those that have two sets of teeth. The first premolar of the upper jaw is wedged in between the second premolar and the great canines, whilst its homotype in the lower jaw stands freely in the middle of a wide space between the canines and second premolars. The cranial sutures are obliterated: those of the face show the great extent to which the premaxillaries unite with the elongated nasals. The alveolus of the upturned superior canines supports a strong longitudinal ridge at its upper part. The chief difference between the Indian and the European Wild Boars as regards the skull, is shown in the longitudinal outline of the cranium, which is convex in the Indian and concave in the German Wild Boar. The skull is also longer in proportion to its breadth and depth in the Indian species.

Presented by W. Storey, Esq.

3250. The skull of an Indian Wild Boar, from Bengal.

Presented by Dr. Wallich, F.R.S.

3251. The skull of an Indian Wild Boar, with the dental series complete and the prenasal ossicle preserved.

Presented by Col. Everett, H.E.I.C.

3252. The skeleton of a Boar (*Sus Scrofa*).

In this specimen, which may be of a domesticated race, there are 14 dorsal and 7 lumbar vertebræ. Two centres of motion are indicated by the vertical direction of the neural spines, the one at the third vertebra of the neck, the other at the eleventh vertebra of the back. The

transverse process of the last cervical, being represented by the diapophysis only, is imperforate. The neurapophysis not only of the atlas and axis, but likewise of the other cervical vertebræ, is perforated for the passage of one of the divisions of the corresponding spinal nerve. The neural spine of the seventh cervical is suddenly increased in length, but is much surpassed both in length and strength by that of the first dorsal, which equals the pleurapophysis of the same vertebra in length. The spines of the succeeding dorsals gradually decrease in length to the eleventh, beyond which those elements differ only in antero-posterior extent. The metapophysis passes from the diapophysis to the zygapophysis in the eleventh dorsal, and continues in that position throughout the lumbar series: there are no anapophyses: the lumbar vertebræ show a slight hypapophysial ridge. The neurapophyses of most of the dorsal vertebræ are directly perforated by the spinal nerves.

Mus. Brookes.

3253. The skull of a German Wild Boar (*Sus Scrofa*), with the permanent dentition; the occiput is mutilated, and the dental series incomplete.

Presented by Henry Cline, Esq.

3254. The skull of a young Wild Boar (*Sus Scrofa*), wanting the last molar teeth.

It is stated in the former edition of the 'Osteological Catalogue,' to be "from India;" but it has the concave contour of the cranium characteristic of the European variety, to which it more probably has belonged.

Hunterian.

3255. The fore part of the cranium, including the incisors, canines, and first premolars, of a Wild Boar.

The shape and partial disposition of the enamel on the upper incisors or tusks are well seen in this specimen.

Hunterian.

The following specimens, to No. 3264 inclusive, are sections of the crania and lower jaws of the Wild Boar, said to be from Germany, of different ages; showing some of the phenomena of the change and progress of dentition.

Presented by Sir Everard Home, Bart., V.P.R.S.

3256. A longitudinally bisected cranium of a young Wild Boar (*Sus Scrofa*).

The crowns of the incipient canine and of the second true molar are exposed in their alveoli of formation. The four deciduous molars and first true molar are in place. The premaxillaries and incisors are wanting.

3257. The rami of the lower jaw of the same cranium.

The four deciduous molars and the first true molar are preserved in the right ramus, the last deciduous molar having the characteristic third lobe, and prefiguring the form of the last

true molar. The germ of the second true molar is exposed in its formative alveolus. In the left ramus the germs of the permanent canine, of the fourth premolar and of the second true molar are exposed, together with the fangs of the last deciduous molar and first true molar. Those of the former are widely divaricated, and inclose the germ of the successional tooth, *p* 4: the fangs of the first true molar are longer and more parallel, and its permanent nature is indicated by the absence of any trace of a successor.

3258. A longitudinally bisected cranium of an older Wild Boar (*Sus Scrofa*).

In this the second true molars have come into place, but not the second premolars, although the third and fourth premolars have been acquired. The germs of the last true molars are exposed in their sockets.

3259. The two rami of the lower jaw of the same skull.

The right shows the fourth premolar, with the first and second true molars in place, and the second and third premolars just appearing above their sockets, the third being most advanced; the germ of the last true molar is exposed. In the left ramus the inner parietes of the molar alveoli have been removed, showing the long fangs of the teeth in place, and the germ of the last true molar.

3260. A longitudinally bisected cranium of an older Wild Boar (*Sus Scrofa*).

In this specimen all the premolars, with the first and second true molars, are in place; but the germ of the crown of the last true molar has not yet left its formative socket, nor has the second deciduous incisor been shed. It is retained on the outside of the crown of its successor.

3261. The lower jaw of a Wild Boar, at a corresponding stage of dentition.

3262. A mutilated right ramus of the jaw of a Wild Boar, at a similar stage of dentition.

3263. A longitudinally bisected cranium of an adult Wild Boar (*Sus Scrofa*).

The sockets of the molar series are exposed on the left side. The first premolar, canines and incisors are wanting in this specimen.

3264. The lower jaw of the same skull, bisected at the symphysis, and with the inner parietes of the molar series removed.

3265. The fore part of the lower jaw, with the incisors, canines and premolars, of a Wild Boar (*Sus Scrofa*).

It shows the effects of the unchecked growth of the lower canines through some defect in the upper ones. The points of both the lower canines, following the curve impressed upon them by the shape of the socket, have re-entered the mouth, piercing the integument and the substance of the jaw itself, the apex of the right tusk projecting forwards on the inner side of the base of the same tusk, whilst the apex of the left tusk presses against the more advanced extremity of the right tusk, where it is buried in the substance of the bone. This is the original specimen figured by Cheselden in his 'Osteographia.' It is entered in the Catalogue of Malformations as No. 133.

Hunterian.

3266. The skeleton of a Hog or castrated Boar, of a domesticated breed (*Sus Scrofa*).

The vertebral formula is:—7 cervical, 14 dorsal, 5 lumbar, 4 sacral: the caudal series is incomplete. The same vertebral characters are repeated in this skeleton as in No. 3252. In the last four dorsals the base of the diapophysis is perforated vertically, close to the orifice for the exit of the nerve in the neural arch.

Mus. South.

3267. The skull of a Boar (*Sus Scrofa*).

From its size and the elevation of the occiput it appears to have belonged to one of the domesticated breeds: many of the teeth are wanting.

Hunterian.

3268. The skull of a young castrated Boar (*Sus scrofa*), mutilated at both extremities.

Hunterian.

3269. The skull of a young Boar, of the domesticated variety.

The skull is mutilated and the dental series is deficient: the last molar teeth are just appearing.

Hunterian.

3270. The skull of a younger Boar.

It has not acquired the last two molars, but the premolars of the lower jaw are in place. The occipital bone is wanting. There are indications in the interior and other parts of the skull, that this young Boar had been fed with madder.

Hunterian.

3271. The skull of a Boar of a domesticated breed (*Sus Scrofa*). *Purchased.*

3272. The skull of a Sow of a domesticated breed (*Sus Scrofa*).

It is characterized by the inferior development of the canines and the concomitant diminution of the extent of the temporal fossæ. The order of appearance of the grinding teeth is

indicated by their different degrees of attrition. The first true molars have been worn to the roots: the second true molars have had all the enamel abraded from the crown: the premolars which are in advance, having come later into place, are less worn; and the last true molar shows the least amount of abrasion.

Purchased.

3273. The cranium of a Sow (*Sus Scrofa*). *Hunterian.*

3274. The left ramus of the lower jaw of a nearly full-grown Sow, showing an extensive and deep ulceration at its outer side. *Purchased.*

3275. The left ramus of the lower jaw of another Sow, showing disease and tumefaction at the same part of the jaw.

Both this and the foregoing specimen were bred in Norfolk.

Purchased.

The following, to No. 3291 inclusive, are parts of the same skeleton of a Hog (*Sus Scrofa*):—

Hunterian.

3276. An anterior dorsal vertebra.

The spinal nerve perforates the base of each neurapophysis horizontally and of each diapophysis vertically.

3277. An anterior dorsal rib.

3278. A middle dorsal vertebra.

It shows the same perforation of the neurapophysis and diapophysis. The metapophysis projects forwards from the fore part of the diapophysis.

3279. A middle dorsal rib.

3280. A lumbar vertebra.

3281. The sacrum.

It includes five anchylosed vertebræ. The articular surfaces for the ilium are vertical.

3282. The right scapula.

The spine is bent down, and terminates in an obtuse angle a little nearer the posterior

than the anterior root. There is no acromion. The coracoid is a low tubercle: the glenoid cavity nearly circular.

3283. The right humerus.

The canal for the medullary artery perforates the external supinator ridge at the back part of the bone and inclines downwards. There are three tuberosities at the proximal end; the middle one is the largest in size, and, with the outer one, answers to the great tuberosity.

3284. The right ulna.

It is remarkable for the great size of the compressed olecranon. The rough surface of attachment for the radius is grooved longitudinally. The contracted distal end presents a small trochlear surface to the carpus, and a very narrow articular strip to the radius.

3285. The right radius.

3286. The os innominatum.

Two tubercles are developed from the part forming the brim of the pelvis. The tuberosity of the ischium is produced into two processes. The slender pubis is bent at a right angle, the symphysial part being the longest. The outer surface of the ilium is divided into two concavities: the inner surface is convex.

3287. The right femur.

The canal for the principal medullary artery enters the fore part of the shaft, one-fourth of its length from the upper end, and inclines downwards and backwards; a second canal enters the back part of the middle of the shaft and runs upwards and forwards.

3288. The left femur.

It shows the same position and direction of the principal medullary artery.

3289. The right tibia.

3290. The right fibula.

3291. The right astragalus.

The anterior articular surface is divided into two subequal facets, the outer one for the cuboides being the largest and least prominent.

The following specimens, to No. 3299 inclusive, are from young Pigs (*Sus Scrofa*) that have been fed on madder for the purpose of illustrating the growth of bone.

Hunterian.

3292. The bisected cranium.

Some portions of the cranium, particularly the internal table, and the fangs of the teeth, still retain the imparted colour; the other parts have lost much of their former redness by long exposure.

3293. The right ramus of the lower jaw, longitudinally bisected, of a Pig, once fed with madder and afterwards with ordinary food.

The dentine of the teeth has become deeply tinged with madder. The last-formed bony substance may still be distinguished from that previously formed, which is stained by the colouring matter.

3294. The left ramus of the same jaw.

3295. The left ramus of the lower jaw, the two tibiæ, and some of the ribs of a very young Pig, killed whilst under the influence of madder.

In the experiment which these bones illustrate, the animal had been 'twice fed' with madder. A section has been removed from the lower border of the jaw, showing the external layer of the bone coloured red.

3296. The right ramus of the lower jaw, with sections of the right humerus and femur, and left tibia and ulna of a young Pig, which had been thrice fed alternately with madder and ordinary food.

3297. The left humerus, radius and ulna, and section of the scapula, with the right scapula, and sections of the right humerus, ulna, tibia and fibula, tinged with madder.

3298. Longitudinal sections of the humerus, femur, and tibia, slightly tinged with madder. *Hunterian.*

3299. A tray of teeth, the dentine and cement of which still show the red stain of madder.

The following, to No. 3327 inclusive, are specimens of the teeth of the Hog (*Sus Scrofa*):—
Hunterian.

3300. Two upper deciduous incisors. 3301. Four lower deciduous incisors.

3302. Two upper second deciduous molars, *d* 2.

3303. Two upper third deciduous molars, *d* 3.

3304. The fourth left upper deciduous molar, *d* 4.

3305. The germs of the three lower permanent incisors.

3306. The germs of the two upper canines.

3307. The germ of the left lower canine.

3308. The upper canines or tusks of a Wild Boar.

3309. The upper tusks of a Wild Boar, apparently from the specimen, No. 3263.

3310. The left upper tusk of a Wild Boar.

3311. The left upper tusk of a Wild Boar.

The enamel tract is less ridged and grooved in this and No. 3310, than in Nos. 3308 and 3309.

3312. The right lower tusk of a Wild Boar.

3313. Two specimens of the right lower tusk of a Wild Boar.

3314. A right lower tusk of a Boar.

3315. Two specimens of the right lower tusk of a young Boar.

3316. Five specimens of the left lower tusk of a Wild Boar.

3317. A tray of lower tusks of the Wild Boar.

3318. The fourth left upper premolar, *p* 4, with the partially absorbed fangs of the fourth deciduous molar which it was about to displace.

3319. The first, *p* 1, second, *p* 2, and third, *p* 3, lower premolars.

3320. The first left upper molar, *m* 1.

3321. The second upper molars, *m* 2.

3322. The crown of the second right upper molar, *m* 2.

3323. The germ of the right, upper, third molar, *m* 3.

3324. A smaller germ of the right, upper, third molar.

3325. The germ of the left, lower, third molar.

3326. The crown of the left, upper, third molar.

3327. The crown of the right, upper, third molar.

3328. The skull of a young Pig (*Sus Scrofa*), with the bones separated, artificially connected together, and numbered on coloured labels according to the TABLE OF SYNONYMS, so as to illustrate the segmental or vertebral constitution of the skull.

The neural arch of the occipital vertebra, 1, 2 and 3, agrees with that of the bird and crocodile in the coalescence of the parapophysis, 4, with the neurapophysis, 3; but the process, called 'paroccipital,' of 4 now descends from the lower part of the arch, and, as in many other mammals, is of great length. An articular condyle is developed from each neurapophysis, 3, which articulates with the concave anterior zygapophysis of the atlas, and is the homotype of the posterior zygapophysis in the trunk-vertebræ. The centrum (1) is reduced to a compressed plate, and its hinder articular surface is not more developed than is the front one of the centrum of the atlas, with which it is connected by ligament. The expanse

of the occipital spine, 3, has been governed by the superior development of the cerebellum in the mammalian class.

The hæmal arch of the occipital vertebra is not here preserved : it is represented, like those of the cervical vertebræ, by the pleurapophysial elements only; but these are developed into broad triangular plates with outstanding processes: that called 'spine' and 'acromion' is exogenous; but that called 'coracoid' is always developed from an independent osseous centre, which is a rudimental representative of the hæmapophysis, coalesces with the pleurapophysis in mammals, and, in that class, only attains its normal proportions, completing the arch with the hæmal spine (episternum), in the monotremes. The diverging appendage (fore-limb) of this arch, though retaining the general features of its primitive radiated form, has been the seat of great development and much modification and adjustment of its different subdivisions in relation to the locomotive office it is now called upon to perform.

With the exception of this excess of development of the appendage, the defective development and displacement of the hæmal arch, and the coalescence of the parapophyses in the neural arch, there are few points of resemblance which are not sufficiently salient between the segment represented by the bones, 1, 2 and 3, in the mammal, and that so marked in the fish (No. 148). And, if the interpretation of the more normal condition of this segment in the lower vertebrate animal, according to the archetypal vertebra (Nos. 28, 29, 30), be accepted, so also must be the explanation here given of the nature of the modifications of the special homologues of the constituents of the occipital segment by which that archetype is masked in the mammal.

In the second segment of the skull, the centrum, 5, is naturally distinct, as in other mammals, and the hæmal arch (hyoid bone) retains its natural connection with the rest of the segment, and by means of a more complete development of the pleurapophyses (38) than in any of the inferior air-breathing vertebrates. In the hog, as in other mammals, may be separated, without artificial division of any compound bone, the entire parietal segment, but with it is brought away the petrified capsule of the acoustic organ (16), and the anchylosed distal piece (27) of the maxillary appendage, which more or less encumbers and conceals the typical character of the neural arch of the parietal vertebra in every mammal: least so, however, in the monotremes and ruminants. The neurapophyses (6) of the parietal vertebræ have coalesced with the centrum, 5, but retain much of the proportions they present in the cold-blooded classes; for the mesencephalic segment of the brain is, in fact, but little more developed in the mammal: they are notched in the present example, but are perforated in the sheep, by the larger divisions of the trigeminal, and they send down an exogenous process, which articulates and sometimes coalesces with the appendage (23) of the palato-maxillary arch, and with the pleurapophysis, 22, of the same arch. The neural spine (7), always developed from two centres in mammals, often vastly expanded, and sometimes complicated with a third, intercalary or interparietal osseous piece, in subserviency to the large size of the prosencephalon, is occasionally uplifted and removed from the neurapophyses by the interposed squamous expansion of the bone (27); but this, which reminds one of the occasional separation of the neural arch from the centrum of the atlas in fishes, is a rare modification in the mammalian class. The parapophysis (8) always commences as an autogenous element by a distinct centre of ossification; it speedily coalesces with the petrosal (16), but otherwise retains its individuality in some

of the lower mammals, as *e.g.* in the Echidna: or it coalesces with the curtailed frontal pleurapophysis 28, as in the present instance, or with the maxillary appendage 27, or with both these and the pleurapophysis of its own vertebra (38), when the complex 'temporal bone' of anthropotomy is the result. In most mammals the pleurapophysis (38) retains its primitive independency and rib-like form, with usually the 'head' and 'tubercle'; but by reason of its arrested growth it has been called 'styloid' bone or process. Sometimes it is separated from the short hæmapophysis (40) by a long ligamentous tract, sometimes is immediately articulated with it, or by an intervening piece. The hæmal spine (41) is usually small, and always single. The rudiments of hypobranchial elements (46) are retained as diverging appendages of the parieto-hæmal arch in all mammals, and have received the special names of 'posterior cornua,' or 'thyrohyals,' from their subservient relationship to the larynx.

In the frontal segment the centrum (9) and neurapophyses (10) very early coalesce. Two separate osseous centres mark out the body, and each neurapophysis has its distinct centre, the optic foramina (*op*) being first surrounded by the course of the ossification from these four points. The superior development of the neurapophysial plates (10), as compared with those of the parietal vertebra (6), in most mammals, harmonizes with the greater development of the prosencephalon; but the chief bulk of this segment is protected by the expanded spines of the frontal (11) and parietal (7) vertebræ, and the intercalated squamosal (27). This appendicular piece not only fulfils some of the functions of the proper cranial neurapophyses, but, likewise, the normal office of the frontal pleurapophysis (28), in the support, viz. of the distal elements of the hæmal arch (29–32), which now articulate directly with 27, in place of 28, as in all oviparous vertebrates. The true pleurapophysis of the frontal vertebra (28) is almost restricted in the mammalian class to functions in subserviency to the organ of hearing; is sometimes, as in the hog, swollen into a large bulla ossea, like the parapophyses and pleurapophyses of the cervical vertebræ of *Cobitis*; is sometimes produced into a long auditory tube, and sometimes reduced to the ring supporting the tympanic membrane. Yet, under all these changes, since its special homology is demonstrable with 28 in the bird (No. 1364) and crocodile (No. 763), as well as with the teleologically compound bone, 28 *a*, *b*, *c*, *d*, in the fish (No. 148), so likewise must its general homology be equally recognised, which is so plainly illustrated in the fish. The frontal hæmapophysis and the corresponding half of the hæmal spine are connate on each side in all mammals. The arch, as in other air-breathing vertebrates, has no diverging appendage.

The nasal segment is chiefly complicated by the confluence of parts of the enormously developed olfactory capsules (18), and its typical character is further masked by the compression and mutual coalescence of the neurapophyses (14). The centrum is usually much elongated, as at 13, and soon coalesces with both neurapophyses (14) and with the nasal capsules (18). The neural spine (15) is bifid. The pleurapophysis (20) or proximal element of the hæmal arch of the nasal vertebra has its real character and import almost concealed by the excessive development of the second element of the arch (21), which resumes in mammals all those extensive collateral connections which it presented in the crocodile; and to which are sometimes added attachments to the expanded spine of the frontal vertebra, as well as to that of its own segment. The pleurapophysis, however, besides its normal attachment to its centrum (13), sends up a process to the orbit, in order to effect a junction with its neurapo-

physis. The hæmal spine (22) is developed in two moieties, which never coalesce together, although, in the higher apes, and at a very early period in man, each half coalesces with the hæmapophysis, and repeats the simple homogeneous character of the corresponding elements of the succeeding (mandibular) arch.

The appendicular element (23) which diverges from the pleurapophysis (20), contributes to fix and strengthen the palato-maxillary arch by attaching it to the descending process of the parietal centrum (6): with which, in most mammals, it ultimately coalesces. The other elements of the diverging member of the arch correspond in number and in the point of their divergence with those in birds, chelonians and crocodiles. They are two in number, succeeding each other, and both become seats of that expansive development which is followed by the multiplication of the points of connection; thus the proximal piece (26, 'malar bone') is connected in the hog not only with the hæmapophysis (21) from which it diverges, but likewise with the muco-dermal bone, called 'lacrymal' (72). The distal piece of the appendage (27) expands as it diverges, and fixes the naso-hæmal arch not only to the frontal pleurapophysis (28), but also to the frontal, parietal and occipital neurapophyses and spines: it also affords, in the hog, as in other mammals, an articular surface to the frontal hæmapophysis (29).

The special names which the vertebral elements alluded to in the foregoing description have received, on account of their peculiar modifications and developments in the cranial region of the vertebrate endoskeleton, will be seen by referring to the column of numbers in the Table of Synonyms. The teeth in the hæmal arches, modified to form jaws, are those of the deciduous series.

Purchased.

3329. The skull of a male Mask-hog (*Sus larvatus*).

It differs from that of the ordinary Wild Boar by the more developed paroccipital processes, which project from the upper and lateral borders of the foramen magnum. The frontal region is flatter and the nasal bones broader; the latter forming a thick rough ridge on each side. The process developed from above the alveolus of the upper tusk is much longer and terminates in a thick rough surface. The bony palate extends further back beyond the last molars, which are relatively smaller. The anterior base of the zygomatic arch swells outward. The first upper premolar is separated by a diastema from the second. The tract of enamel on the under surface of the upper tusks is narrower, but more deeply grooved and ribbed. The second premolar is smaller and more simple, as are also the second incisors. One of the anterior premolars is wanting in the upper jaw, and both, together with the right second premolar, are wanting in the lower jaw: the last true molar shows its characteristic relative inferiority of size as compared with that in the *Sus Scrofa*.

Purchased.

3330. The skull of a female Mask-hog (*Sus larvatus*).

The sexual distinction is shown by the inferior size of the entire cranium as compared with the extent of the molar series, which is nearly the same as in the male; in the inferior size of the tusks; in the absence of the lateral ridges from the nasals, and the reduction of the

process from the canine alveolus to a mere ridge. The first premolar is wanting on the left side, upper jaw, and on both sides of the lower jaw ; where also only minute rudiments of the second premolars are visible.

Purchased.

3331. The skull of a male Babyroussa (*Sus Babyrussa*).

As compared with the *Sus Scrofa* and *Sus larvatus* the occiput is broader and lower : the mastoids are larger, the temporal fossæ more approximated on the upper part of the cranium: the bony palate more produced beyond the last molars, which are relatively smaller. The first premolars in the upper jaw and the first and second premolars in the lower jaw are not developed : the second premolar is early shed and usually wanting in the upper jaw. The outer incisors are not functionally developed and are usually wanting in the upper jaw. The canines are longer and more slender, and the sockets of the upper ones are bent more directly upwards ; the naso-maxillary part of the cranium being slightly compressed between them. A remarkable peculiarity is also presented by the fossæ at the inner side of the base of the pterygoids, which lead to sinuses communicating on one or both sides with the sphenoidal sinus. The sockets of the antepenultimate premolars, *p* 2, and the rudiment of that tooth on the left side are preserved in the upper jaw : the rudiment of the corresponding premolar is retained on the left side of the lower jaw.

Hunterian.

3332. The skull of a male Babyroussa.

All the molars are much worn, but the temporal fossæ are separated by a space of nearly an inch upon the parietal. The internal divisions of the pterygoid fossæ are large, deep, and well-defined ; the right one communicates with the sphenoidal sinus. The dried integument of the snout and the fore part of the face remains attached, and shows the perforation of the integument by the long upper ascending and recurved canines.

Hunterian.

3333. The skull of a male Babyroussa.

The enamel has been abraded from the summit of the second as well as the first true molar. The canines in both jaws, and the incisors, are wanting. The temporal fossæ are divided by merely a ridge upon the parietal.

Hunterian.

3334. The skull of a male Babyroussa.

The enamel has been abraded from the summit of the first true molar, *m* 1, and partially from that of the second true molar, and the premolars. In the upper jaw the socket for the two-fanged antepenultimate premolar, *p* 2, may be seen, in advance and on the inner side of the three-fanged penultimate premolar, *p* 3. The pterygoid sinuses are large and complex.

Presented by Col. Everest.

3335. The skull of a male Babyroussa.

The crown of the first true molar, *m* 1, is much worn. The pterygoid sinuses are large and complex.

Presented by John Gaitskell, Esq.

3336. The skull of a male Babyroussa.

The base of the skull has been removed, showing the communication between the sphenoidal sinus and the pterygoid cells.

Presented by Dr. Wallich, F.R.S.

3337. The skull of a male Babyroussa.

The enamel has been abraded from the summit of the first molar, *m* 1, and the base of the skull has been removed, but shows no communication between the pterygoid cells and the sphenoidal sinus.

Hunterian.

3338. The skull, with much of the dried integument, longitudinally bisected, of a male Babyroussa.

The sphenoidal sinus communicates with the left pterygoid sinus, both outer and inner divisions of which are largely developed. The petrosal, or bony capsule of the acoustic organ, which does not coalesce with any of the elements of the temporal in the Babyroussa, has been detached on one side. All the functionally developed incisors are here preserved, the outer ones below having no homotype above. Both the first and second premolars are suppressed in both jaws. There is no ossified prenasal.

Presented by Joseph Vernon, Esq.

3339. Skull of a female Babyroussa.

The tusks are comparatively short in this sex. The tubercles of the penultimate, *m* 2, and last, *m* 3, molars are very slightly abraded. The first and second premolars, *p* 1 & *p* 2, are not developed. The suppression of the first and second upper premolars in most individuals of the *Sus Babyroussa* appears to be due to the inordinate length of the upper canines and the up-bent direction of their long sockets, characteristic of the species. Their homotypes are equally undeveloped in the lower jaw, in which the canines are also very long. The external incisors are absent in the upper jaw, but rudiments of their sockets may be discerned. They are normally developed in the lower jaw.

Presented by Dr. Babington.

3340. The skull of a female Babyroussa. *Hunterian.*

3341. The skull of a female Babyroussa, with small and simple pterygoid fossæ.

This specimen is from Sumatra.

Presented by Daniel Moore, Esq.

3342. The skull of a female Babyroussa. *Hunterian.*

3343. The skull of a female Babyroussa. *Hunterian.*

3344. The skull of a Babyroussa, somewhat mutilated, and the dentition incomplete.

The upper tusks show the same inferiority of size as the two preceding specimens.

Presented by Thomas Keate, Esq.

3345. The skull of a female Babyroussa.

The cranium has been transversely bisected through the largely developed mastoids, showing their cellular structure. The mastoid is confluent with the tympanic and squamosal, but not with the petrosal: that capsule of the acoustic organ retains its primitive individual character, and may be detached from the other elements of the 'temporal bone.' The large occipital air-sinus is seen above the cranial cavity; there are no sphenoidal sinuses; the pterygoid fossæ are small and simple in this skull.

Hunterian.

3346. A longitudinally bisected cranium of a Babyroussa.

It shows the extension of the air-cells through the upper part of the cranial cavity to the occiput, and the communication of the sphenoidal sinus with the pterygoid fossæ. The constituent bones have been numbered on coloured labels, according to the TABLE OF SYNONYMS.

Presented by William Long, Esq.

3347. The skull of a Babyroussa, wanting part of the occiput. The dried integument is left upon the fore part of the skull. *Hunterian.*

3348. The skull of a Babyroussa, with the grinding surface of all the molars much worn, and the base of the skull removed, showing the canal of communication between the sphenoidal and right pterygoid sinus.

Presented by Sir Everard Home, Bart., V.P.R.S.

3349. The cranium of a Babyroussa, wanting the canines and incisors. The inner division of the pterygoid cells is shallow. The upper division ascends to the posterior root of the zygoma. *Hunterian.*

3350. The lower jaw of a Babyroussa, with the crowns of the molar teeth much worn. *Hunterian.*

3351. The lower jaw of a Babyroussa, with the grinding teeth more worn, and

with an unusually large outlet in the dental canal, beneath the fourth premolar. *Hunterian.*

3352. The right inferior canine of a young, and probably female, Babyroussa. *Mus. Brit.*

Genus *Phacochœrus.*

3353. The skull of the North African Wart-hog (*Phacochœrus Æliani*).

The fronto-parietal region is broad and flat, except transversely, where it is rendered concave by the orbits being raised above its level: those cavities are placed farther back than in the other *Suidæ*. The paroccipital processes are long and slender. The mastoids are compressed and pointed, and are much less developed than in the Wild Boar, the Masked Boar, or the Babyroussa. The pterygoid fossæ are simple; not divided into an external and internal compartment, as in the Babyroussa, but they are more extended backwards. The sockets of the canines have not the process from the upper part, as in the *Sus larvatus*. The maxillo-premaxillary suture is obliterated, except at the apex of the premaxillaries which extend beyond the sockets of the tusks. The upper incisors are here further reduced than in the Babyroussa, viz. to 1—1 in the upper jaw: the incisors are retained in normal number, 3—3, in the lower jaw. The first true molar, *m* 1, is worn down to its stumps, but is retained on the right side. The last premolar, *p* 4, and the socket of the penultimate one, *p* 3, are present on both sides of the upper jaw. In the lower jaw the first true molar, *m* 1, has been shed on both sides and its socket absorbed, so that the last premolar, *p* 4, has come into contact with the second true molar, *m* 2. There is no trace of a socket of any other of the molar series.

Mus. Brookes.

3354. The skull of a *Phacochœrus Æliani.*

In this the first true molar, *m* 1, has been shed in both jaws, but an interval is still preserved, in which some trace of its socket may be discerned between the last premolar, *p* 4, and the second true molar, *m* 2. The penultimate premolars, *p* 3, are preserved in the upper jaw; they have been shed, or not developed, in the lower one.

Hunterian.

3355. The skull of a *Phacochœrus Æliani,* wanting the inferior tusks, and the cranium much mutilated.

This serves to show the extent of the pterygoid sinus on the left side, and also the great posterior extension of the supracranial sinuses. The rhinencephalic fossa is large and well-defined. This skull is the original from which the figure was taken which forms the subject of Tab. xviii., 'Philosophical Transactions' for 1799, in illustration of Home's paper, entitled—"Some Observations on the Structure of the Teeth of Graminivorous Quadrupeds, particularly those of the Elephant and *Sus Æthiopicus.*" Only the large and complex third molars, *m* 3, remain in the upper jaw; the trace of the socket of the second molar, *m* 2, is

seen in front of it. The socket of the corresponding tooth is better preserved in the lower jaw. The socket of the last molar has been laid open on the inner side of the right ramus and the tooth removed. Five of the inferior incisors have been preserved, and the sockets of the two above show that they have been accidentally lost.

Hunterian.

3356. The upper part of the cranium, with the upper tusks, premaxillary bones, and the sockets of the two upper incisors, of the *Phacochœrus Æliani.*

Hunterian.

3357. A portion of the upper part of the cranium, with the upper canines, premaxillary bones, and right and left upper incisors, of the *Phacochœrus Æliani.*

Hunterian.

3358. The upper part of the skull, with the bony palate, the last molars, last premolars, and canine tusks, of the *Phacochœrus Æliani.*

The traces of the sockets of the second molars, *m* 2, still remain; those of the two upper incisors are almost obliterated. The section of the basisphenoid exposes the sinus which communicates with the right pterygoid sinus. The cells at the outer part of the base of the pterygoid do not communicate with the internal pterygoid fossæ.

Presented by Prof. Owen, F.R.S.

3359. The anterior extremity of the cranium, with the upper tusks, of the *Phacochœrus Æliani.* *Mus. Brit.*

3360. The skull, with the dried integument, longitudinally bisected, of the *Phacochœrus Æliani.*

Notwithstanding the superior size of the skull, the cranial cavity is not larger than that of the Babyroussa, but is curved from before backwards and downwards in a greater degree, so that the tentorial ridge is almost horizontal. The frontal sinuses are almost separated from the parietal and occipital ones by the near approximation of the inner to the outer table of the skull between the orbits. In the left half of this skull the grinding surface of both upper and lower molar series is exposed, the upper series showing five teeth, as in the Babyroussa, viz. two premolars, *p* 3 & *p* 4, and three true molars, *m* 1, *m* 2 & *m* 3: but the first molar, *m* 1, is reduced to the last rudiment, and is almost squeezed out of place by the approximation of the second molar, *m* 2, to the last premolar, *p* 4. A remnant of the first molar, *m* 1, is preserved in the lower jaw; but the grinders are here four in number, because no other premolar save the last, *p* 4, is retained. In the opposite moiety the jaws are preserved in natural position; a greater proportion of the first true molar remains in the upper jaw, but it is wholly shed in the lower jaw, although the interval is not quite obliterated.

Presented by Sir Everard Home, Bart., V.P.R.S.

3361. The skeleton of a young *Phacochœrus Æliani.*

The vertebral formula is :—7 cervical, 13 dorsal, 5 lumbar, 2 sacral, 23 caudal: in older specimens anchylosis extends from the sacral into the caudal region. Six pairs of ribs directly join the sternum, which consists of five bones. The costal parts of the transverse processes progressively increase in breadth from the third to the sixth cervical: they are wanting in the seventh, the transverse processes of which are imperforate. The base of the neural arch is perforated in all the cervicals. The medullary artery penetrates the fore part of the upper third of the shaft of the femur, and the rest of the skeleton closely conforms to the Hog-type.

The instructive state of the dentition in this specimen explains the remarkably disproportionate shortness of duration of the first molar, *m* 1, as compared with the other two, *m* 2 & *m* 3, and the concomitant early obliteration of its socket. The grinding teeth in use in the upper jaw are the three deciduous, *d* 2, *d* 3, *d* 4, and first permanent, *m* 1, molars on each side: the latter tooth has remarkably long fangs; those of the last deciduous molar are comparatively short. The alveolus of the germ of the last premolar, *p* 4, is exposed above those fangs on the left side. The apices of the canine tusks and the summit of the second true molar, *m* 2, are protruded from their sockets. The crown of the upper permanent incisor is exposed in the left premaxillary bone. In the lower jaw two deciduous molars, *d* 3, *d* 4, only are developed on each side. The germ of the last premolar, *p* 4, is exposed on the left side, together with that of the second true molar, *m* 2, and the very long fangs of the first true molar, *m* 1. This molar comes into place and use very soon after the deciduous molars; consequently, by the time that the crowns of the last premolar and second true molar have come into use, that of the intermediate tooth, *m* 1, has been worn away.

Purchased.

3362. The skull of the Ethiopian Wart-hog (*Phacochœrus Pallasii*).

This differs from the preceding species in the absence of the upper incisors and the very early loss of the lower ones, of which no trace remains in the present specimen. There are three grinding teeth on each side of both jaws, which consist of the last premolar, *p* 4, and second, *m* 2, and third, *m* 3, true molars. The first true molar, *m* 1, has been shed, its socket is obliterated, and the teeth which it originally separated have come into close contact, as in the former species. The last premolar, *p* 4, is relatively smaller and less complex in the present species, and the upper canine differs by its narrower posterior groove.

Hunterian.

3363. The skull of an older *Phacochœrus Pallasii.*

The second molars, *m* 2, have been shed and their sockets obliterated in both jaws, but a rudiment of the fourth premolar, *p* 4, is retained, and the stumps of four rudimental incisors may be seen on the alveolar border of the lower jaw. There is no trace of incisors or sockets in the upper jaw.

Hunterian.

3364. The integuments of the head, with portions of the upper and lower jaws, of the *Phacochœrus Pallasii,* from the Cape of Good Hope. *Hunterian.*

The following, to No. 3368 inclusive, are detached teeth of the North African Wart-hog (*Phacochœrus Æliani*) :—

Mus. Brit.

3365. The upper canines, or tusks.

The right one has had its apex broken away: the left measures 1 foot 8 inches in length, following the outer curvature.

3366. Six specimens of the right upper tusk.

3367. Four specimens of the left upper tusk.

3368. The last molar, right side, lower jaw.

A slice has been removed transversely from the summit of the crown, and the cut surface polished, to show the three different substances, 'dentine,' 'enamel,' and 'cement,' of which this complex grinder is composed. It is the original specimen figured in the 'Philosophical Transactions,' 1799, tab. xix. fig. 2 & 3, and was removed from the skull, No. 3355.

Hunterian.

The following, to No. 3379 inclusive, are detached teeth of the South African Wart-hog (*Phacochœrus Pallasii*) :—

3369. An upper canine, apparently of a female. *Mus. Brit.*

3370. The upper canines, or tusks.

They show, in comparison with those of the *Phacochœrus Æliani*, the characteristic narrower impression upon their inferior surface.

Hunterian.

3371. The fourth premolars, *p* 4, and the remnant of the second true molar, *m* 2, from the right side of the upper jaw.

The worn crowns of the premolars present a crescentic island of dentine surrounded by enamel.

Hunterian.

3372. The fourth upper premolars, *p* 4. *Mus. Brit.*

3373. The first upper molars, *m* 1, of the same animal.

Their crowns are worn down nearly to the base, and the fangs, four in number, have been greatly reduced by the absorbent process.

Mus. Brit.

3374. The second upper molars, *m* 2, of the same animal.

The enameled part of the crown has been about half worn down, but a considerable body of dentine surrounded by unpolished cement remains before the fangs are sent off. These are four in number, with some accessory processes, and are bent upwards and backwards at an obtuse angle to the crown.

Mus. Brit.

3375. The last upper true molars, *m* 3, of the same animal.

About one half of the fore part of the grinding surface has come into use. Nineteen columnar processes of dentine, six of which form a linear series along the centre and are surrounded by thirteen peripheral columns, were in course of formation at the base of this complex tooth.

The four grinders of the right side of the above series, Nos. 3372—3375, are figured *in situ* in tab. xix. of the 'Philosophical Transactions' for 1799, in illustration of Home's paper above cited. The teeth are drawn somewhat reduced in size, but not in a just proportion to the reduction of the size of the cranium and of the upper tusks. Nor are the relative lengths of the crown and fangs correctly given. The crown of the first true molar *e. g.* is represented of the same length as that of the fourth premolar which precedes it, and nearly of the same length as that of the second true molar; whereas in the original it is much shorter, in consequence of having been longer in use.

Mus. Brit.

3376. The fourth lower premolars, *p* 4, of the same animal.

Like the corresponding teeth of the upper jaw, only the tip of the obtusely rounded crown is worn.

Mus. Brit.

3377. The first lower molars, *m* 1, of the same animal.

Their crown is almost worn down, and their roots have been absorbed, like their homotypes above; but the crown is narrower in proportion to its length.

Mus. Brit.

3378. The second lower molars, *m* 2, of the same animal.

The crown is as little worn as in the corresponding teeth above: it consists of ten columns of dentine, each surrounded with enamel and the whole connected together with cement. The lower tooth differs from the upper one in its inferior breadth, but resembles it in other respects, especially in the curvature of the fangs, which are also four in number. The posterior part of the crown is worn a little flat by pressure against the succeeding large molar.

Mus. Brit.

3379. The last lower molars, *m* 3, of the same animal.

The crown has been worn in the same proportion as in the last upper molars, and the constituent dentinal columns are of nearly equal length; but they were still in course of forma-

tion at their base. They are nineteen in number, six being central and thirteen peripheral, but more regularly disposed in a narrower space of greater antero-posterior extent than in the upper tooth. The columns rapidly decrease in length from the posterior ones which are in use; and it would seem by comparison with the same tooth in older animals, that a greater number are subsequently added to the back part of the series. Thus in the fully-formed last lower molar of No. 3362 the number of enamelled columns is twenty-six, nine being central and seventeen peripheral.

The teeth described in the foregoing paragraphs, Nos. 3372 to 3379, were removed from a small head, in a dried state, of a Wart-hog, discovered by Sir Joseph Banks in his search after the skulls of animals, deposited in the British Museum, with a view to further the researches of Sir Everard Home on the teeth of the *Sus Æthiopicus,* which formed the subject of his memoir in the 'Philosophical Transactions' for 1799. The above-specified character of the tusks, No. 3370, and the small proportional size of the fourth premolar, *p* 4, in both jaws, with the minor breadth and thickness of the second and third true molars, prove the species to which the head in question belonged to have been the *Phacochœrus Pallasii,* and to be a distinct species from that figured—also as the *Sus Æthiopicus*—in tab. xviii. of the same memoir.

Mus. Brit.

Genus *Dicotyles.*

3380. A skeleton of the White-lipped Peccari (*Dicotyles labiatus*).

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 5 sacral, and 6 caudal. The axis vertebra has a short pointed diapophysis: the third vertebra has a pleurapophysial lamella coextensive with the centrum. The corresponding lamella increases in extent in the fourth, the fifth, and very remarkably so in the sixth cervical, and they overlap each other. The bony plate between the anterior zygapophysis and diapophysis is perforated by the spinal nerve in the last four cervical vertebræ. The third and fourth cervical vertebræ terminate above in a large platform of bone supported by vertical neurapophysial walls, without a neural spine. In the fifth a neural spine is developed, and the spine progressively increases in length and inclines forwards in the sixth and seventh cervicals. The neural spines of the first and second dorsals are vertical, and as long as the pleurapophyses of the same vertebræ. The succeeding dorsal spines gradually diminish in length and incline backwards to the twelfth, which is short and vertical. The metapophyses begin to be developed at the third dorsal, and increase in length to the eleventh, after which they rise upon the zygapophyses. The neural arches of all the dorsal vertebræ are directly perforated by the spinal nerves, and the base of the diapophysis is vertically perforated. The diapophysis of the fourteenth dorsal vertebra begins to show the increase of size which characterizes the lumbar series. Seven pairs of ribs directly articulate with the sternum, which consists of six bones. The humerus is perforated between the condyles, and the radius and ulna have coalesced throughout nearly their whole extent. In the right femur the medullary artery enters the upper and fore part of the shaft, as in the common Hog: this is not the case with the left femur. The bones of the feet are incomplete in the present skeleton.

Hunterian.

3381. The skull of a Collared Peccary (*Dicotyles torquatus*).

The teeth have been removed from the right side of the upper and left side of the under jaw. The skull is remarkable for the strong ridge which extends from the lower border of the malar bone and the malar process of the maxillary. The pterygoids have not the fossæ which were noticed in the Babyroussa and Wart Hogs.

Hunterian.

3382. The premolars and molars of the right side of the upper jaw of the same Peccary (*Dicotyles torquatus*). *Hunterian.*

3383. The second premolar, *p* 2, the last true molar, *m* 1, with portions of the intervening teeth, *p* 3, *p* 4, *m* 1 and *m* 2, of the left side of the lower jaw of the same Peccari (*Dicotyles torquatus*). *Hunterian.*

The following, to No. 3401 inclusive, are parts of the same skeleton of the Collared Peccari (*Dicotyles torquatus*).

Hunterian.

3384. The skull.

The right lower canine has been shed and its socket obliterated.

3385. The atlas.

3386. The axis.

3387. The sixth cervical vertebra.

It is remarkable for the size of the pleurapophysial part of the transverse process, which is coextensive with the centrum at its base, and spreads out both forwards and backwards, as it extends downwards and outwards.

3388. The six hinder dorsal vertebræ.

They show the backward inclination of the three anterior and the forward inclination of the three posterior neural spines.

3389. A dorsal or thoracic rib.

3390. The sacrum.

The first neural spine is free, and separated from the second by an oval hole; the neural spines of the second, third and fourth sacral vertebræ, although their limits are definable, coalesce. The lower end of the fourth spine becomes confluent with the succeeding spine, and this with the spines of the anterior caudal vertebræ, forming a rough and broad ridge.

There are four holes for the exit of the anterior spinal roots, and the same number for the posterior ones. The fifth sacral nerve passes out by the notch indicating the termination of the sacrum and the body of the first caudal vertebra.

3391. The right scapula.

3392. The left humerus.

The canal for the medullary artery enters the bone three-quarters of an inch above the condyles, and inclines downwards towards the joint. The intercondyloid space is perforated.

3393. The coalesced radius and ulna. 3394. The right ilium.

3395. The left femur.

The canal for the medullary artery is obliterated.

3396. The left tibia. 3397. The left fibula. 3398. The left calcaneum.

3399. The metatarsals answering to the third and fourth of the pentadactyle foot.

They have coalesced at their proximal ends, to the extent of one-fifth of their whole length.

3400. A proximal phalanx. 3401. An ungual phalanx.

3402. The articulated bones of the right fore extremity from the humerus downwards.

The inner division of the great tuberosity rises considerably above the head of the bone: the intercondyloid space is perforated. The shafts of the radius and ulna have coalesced. The trapezium and pollex are not developed. The index and minimus digits are both very small. The medius and annularis are very large, and are chiefly serviceable in progression.

Hunterian.

3403. The articulated bones of the right hind extremity from the femur downwards.

The fifth as well as the first toe are wanting in the hind foot: the second toe is rudimental: the third and fourth are very large, and form a symmetrical pair, showing that the artiodactyle structure essentially prevails, although the toes, by the non-development of the fifth, which is present in the other Suidæ, are reduced to three in number in the hind foot.

Hunterian.

Genus *Hippopotamus.*

Dental formula :—$i\,\frac{2-2}{2-2}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{4-4}{4-4}$, $m\,\frac{3-3}{3-3}=40$.

3404. The skeleton of a Hippopotamus (*Hippopotamus amphibius*).

The vertebral formula is :—7 cervical, 15 dorsal, 4 lumbar, 6 sacral : 13 caudal vertebræ are preserved, but a few terminal ones are wanting. The pleurapophysial parts of the transverse processes of the third to the sixth cervical inclusive develope hatchet-shaped plates, progressively increasing in size, which overlap each other. The second and third cervicals have bitubcrculate hypapophyses. The transverse processes of all the cervicals are perforated by the vertebral arteries. Six pairs of ribs directly join the sternum, which consists of five bones and a broad ensiform cartilage. A metapophysial ridge is developed above the diapophysis of the eighth dorsal, changes its position and shape with increase of size in the two succeeding vertebræ, in the eleventh projects forwards from above the prozygapophysis, and so continues throughout the rest of the dorsal and the lumbar series. There are no anapophyses, but a broad plate is developed from the back part of each transverse process of the last lumbar, which presents an articular convexity for a corresponding concavity on the fore part of the transverse process of the first sacral vertebra. The acromial angle of the scapula is slightly produced : the coracoid is recurved. The greater tuberosity of the humerus is divided into two subequal processes, the inner one separated by a deep and wide bicipital fossa from the lower inner tuberosity. The ulna and radius have coalesced at their extremities and at the middle of their shaft, the interosseous space being 'indicated' by a deep groove and two foramina. The trapezium does not support any digit : of the other four, the two middle ones, answering to the third and fourth, are most developed. The femur has no third trochanter. The canal for the medullary artery commences at the upper and fore part of the shaft. The fibula is distinct from the radius, and extends from its proximal end to the calcaneum. The internal cuneiforme is present in the tarsus, but there is no rudiment of the innermost toe : the proportions of the other four resemble those of the fore-foot.

Mus. Brookes.

3405. The skull of an old male *Hippopotamus amphibius.*

The grinding teeth in the upper jaw have been reduced to the last two premolars and the three molars, from the first and second of which the cusps have been worn down to the common dentinal base. In the lower jaw the sockets of the last three premolars remain : the molars are worn as in the upper jaw.

Hunterian.

3406. The skull of a less aged male *Hippopotamus amphibius.*

The sockets of the four premolars remain on each side of the upper jaw, those of the first, *p* 1, being unusually large : there is no trace of them in the lower jaw. The last molar, *m* 3, is in place and has been slightly worn. The organs of hearing have been removed, and the cranium is otherwise mutilated.

Hunterian.

3407. The cranium of a *Hippopotamus amphibius.*

The last molar has come into place, but is unworn: the last deciduous molar is retained on the left side, but has been shed, or removed on the right side to show the summit of the more simple last premolar, *p* 4, which was about to emerge.

Presented by Richard Welbank, Esq., F.R.C.S.

3408. The skull of a female *Hippopotamus amphibius.*

The last molars, *m* 3, have half protruded from their sockets in the lower jaw, where the last premolars have risen into place. In the upper jaw the last molars are beginning to protrude, and the last premolars are less advanced, especially on the left side, where the last deciduous molar seems to have been artificially removed to show the point of its successor. The sockets of the anterior premolars, *p* 1, are obliterated.

Hunterian.

3409. The skull of a female *Hippopotamus amphibius.*

It shows a similar stage of dentition to the foregoing. The points of the last premolars have protruded in both jaws, but they are less advanced than the last molars: traces of the sockets of the first premolars, *p* 1, remain in the upper jaw.

Hunterian.

3410. The skull of a young *Hippopotamus amphibius.*

The last molars are exposed in, but have not protruded from, their formative alveoli, and the last deciduous molars, *d* 4, have not been shed: they are much worn in both jaws. The sockets of the first premolars remain in the upper jaw.

Hunterian.

3411. The cranium of a young *Hippopotamus amphibius.*

The first, second and third premolars, and the first and second true molars have come into place: the last milk-molar, *d* 4, is retained: the last true molar may be seen in its formative socket, from which it has not emerged. The protruded parts of the permanent incisors and canines are each between two and three inches in extent.

Hunterian.

3412. The skull of a younger *Hippopotamus amphibius.*

The teeth in place in both upper and lower jaws are, the permanent incisors and canines, the first premolars, the second, third and fourth milk-molars, and the first true molars.

The canines are larger than the incisors: the median incisors are much more developed than the lateral ones in the lower jaw. The outer parietes of the formative alveoli of the second, third and fourth premolars have been removed from the left side of both jaws.

Hunterian.

3413. The separated bones of the skull of a new-born or very young *Hippopotamus amphibius.*

The deciduous incisors and canines and the summits of the first three deciduous molars, *p* 1, *d* 2 and *d* 3, have protruded in both jaws: those of the fourth (last) deciduous molar had just begun to pierce the gum in the lower jaw, but had not emerged from the formative socket in the upper jaw. The germs of the permanent incisors and canines and of the first true molars (*m* 1) had begun to be calcified. In the premaxillary there is a smooth deep fossa at the back part of the interspace between the two deciduous incisors, which may have contained either the germ of a third incisor, or of a successional incisor.

In the upper jaw the first, *p* 1, and second, *d* 2, deciduous molars have simple conical crowns: the third, *d* 3, has four cusps, the two hindmost being on the same transverse line: the fourth, *d* 4, has four cusps in two transverse pairs, like the permanent molars. In the lower jaw the first, *p* 1, and second, *d* 2, deciduous molars have conical crowns: the third, *d* 3, has two principal cusps, the second being bifurcate, answering to the pair of cusps in the broader tooth above: it has also an anterior basal talon, answering to the first cusp of the corresponding tooth above, and a very small posterior talon: the fourth milk-grinder, *d* 4, has three pairs of cusps, with an anterior and posterior talon. The tooth here described as the first deciduous molar is less advanced in its development than *d* 2 and *d* 3, and, as it has no vertical successor, it may be regarded as the first premolar, *p* 1. The basioccipital has partially coalesced with the basisphenoid, but not with the exoccipitals; it forms no part of the occipital condyles, and developes no processes from its under surface: its lateral synchondrosal surfaces are divided into two facets, one for the part of the exoccipital behind the precondyloid foramen, the other for the smaller part in front. These parts of the exoccipital have not coalesced on the inner side of that foramen, which is single: the exoccipital developes, besides the condyloid process, the paroccipital and a broad process to join the mastoïd. The superoccipital is a thick, rhomboid, vertical plate. The alisphenoids have coalesced with the basisphenoid: they are short, and are grooved behind by the boundary which they contribute to the foramen common to the foramen ovale and the basicranial foramen lacerum, and more deeply in front by the part they contribute to the foramen common to the foramen rotundum and foramen lacerum anterius: they develope long pterygoid processes, which are imperforate, and articulate along their inner sides with the entopterygoids. The presphenoid has coalesced with the orbitosphenoids and with the rudimental prefrontals, which are connate, compressed, and form the median septum of the great anterior outlet of the cranial cavity. The vomer is a long, slender, pointed bone, deeply grooved above. The parietals articulate with the alisphenoids, orbitosphenoids, squamosals, mastoids, frontals, superoccipital, and each other. The under part of the frontal is divided into a cranial, orbital and olfactory surface; the orbital surface being the largest, and the superorbital ridge broad and much produced. The petrosal, mastoid, tympanic and squamosal elements of the temporal have coalesced. The meatus internus is a deep fossa divided into a cribriform surface below and a canal above: the tympanic swells into a large three-sided conical protuberance below. The palatines prolong the bony palate beyond the series of grinding teeth in use. The symphysis of the lower jaw is not obliterated.

Presented by Prof. Owen, F.R.S.

3414. The skull of a fœtal *Hippopotamus amphibius.*

The germs and formative alveoli of two incisors only exist in each premaxillary bone: the germ of the deciduous canine is more advanced: the germs and alveoli of three deciduous molars (*p* 1, *d* 2, and *d* 3) have been established. In the lower jaw the germs of the two mid-incisors and of the canines have begun to be calcified: the formative alveoli of the lateral incisors do not contain any calcified germs. The length of this skull is five inches.

Presented by William Clift, Esq., F.R.S.

3415. The anterior portion of the upper jaw of a young Hippopotamus, with the incisors. *Hunterian.*

3416. A right upper incisor of a Hippopotamus. *Mus. Brit.*

3417. A right upper incisor of a Hippopotamus. *Hunterian.*

3418. A left upper incisor of a Hippopotamus. *Hunterian.*

3419. The anterior portion of the lower jaw of a Hippopotamus, with the incisors. *Hunterian.*

3420. An incisor from the lower jaw of a Hippopotamus. *Hunterian.*

3421. An incisor from the lower jaw of a Hippopotamus.
Presented by Sir J. Banks, Bart., P.R.S.

3422. The corresponding incisor of a Hippopotamus.
Presented by Sir J. Banks, Bart., P.R.S.

3423. An incisor from the lower jaw of a Hippopotamus. *Hunterian.*

3424. An incisor from the lower jaw of a Hippopotamus. *Hunterian.*

3425. A large incisor from the lower jaw of a Hippopotamus. *Hunterian.*

3426. An incisor from the lower jaw of a Hippopotamus.
Presented by Mr. Greville.

3427. The corresponding incisor of a Hippopotamus. *Presented by Mr. Greville.*

3428. An incisor from the lower jaw of a Hippopotamus. *Hunterian.*

3429. An incisor from the lower jaw of a Hippopotamus. *Mus. Brit.*

3430. A canine from the right side of the upper jaw of a Hippopotamus.
Mus. Brit.

3431. The two lower canines of a Hippopotamus. *Hunterian.*

3432. A canine from the right side of the lower jaw of a Hippopotamus. *Mus. Brit.*

3433. A canine from the left side of the lower jaw of a Hippopotamus, having an unusual curvature. *Hunterian.*

3434. A canine from the left side of the lower jaw of a Hippopotamus. *Hunterian.*

3435. A canine from the left side of the lower jaw of a Hippopotamus. *Hunterian.*

3436. A canine from the left side of the lower jaw of a Hippopotamus. *Mus. Brit.*

3437. A canine from the lower jaw of a Hippopotamus. *Mus. Parkinson.*

3438. A canine from the lower jaw of a young Hippopotamus. *Hunterian.*

3439. A canine from the lower jaw of a Hippopotamus. *Hunterian.*

3440. A canine from the lower jaw of a Hippopotamus. *Hunterian.*

3441. A canine from the lower jaw of a Hippopotamus. *Hunterian.*

3442. A canine from the lower jaw of a Hippopotamus. *Hunterian.*

3443. Two molars of a Hippopotamus, in polished sections, viz.—

a. A vertical section of the last true molar (*m* 3) from the right side of the upper jaw.
b. The corresponding section.
c. A transverse section of the penultimate molar (*m* 2) from the left side of the under jaw.

Presented by Sir Everard Home, Bart., V.P.R.S.

3444. Five molars of the Hippopotamus, viz.—

a. The first true molar (*m* 1) from the right side of the upper jaw.
b. The second true molar (*m* 2) from the right side of the upper jaw.
c. The third true molar (*m* 3) from the left side of the under jaw.
d. An incipient molar from the right side of the upper jaw.
e. An incipient molar from the right side of the upper jaw.

Hunterian.

Suborder *RUMINANTIA.*

Family *Camelidæ.* (Camels, Llamas, Vicunas.)

Genus *Camelus.*

3445. The skeleton of the Camel (*Camelus bactrianus*).

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, and 4 sacral: there are 15 caudal vertebræ in the present instance, but some of the terminal ones are wanting. Seven pairs of ribs articulate directly with the sternum, which consists of six bones, the last being greatly expanded and protuberant below, where it supports the pectoral callosity in the living animal. The cervical region is remarkable for its length and flexuosity, and the vertebræ are peculiar for the absence of the perforation for the vertebral artery in the transverse process, with the exception of the atlas; that artery, in the succeeding cervicals, enters the back part of the neural canal, and perforates obliquely the fore part of the base of the neurapophysis. The costal part of the transverse process is large and lamelliform in the fourth to the sixth cervical vertebræ inclusive: in the seventh it is a short protuberance. The metapophysial tubercle is developed from the diapophysis in the eleven anterior dorsal vertebræ, and passes upon the zygapophysis in the twelfth, continuing in that position throughout the lumbar series. There are no anapophyses. The spinous process of the first dorsal suddenly exceeds in length that of the last cervical, and increases in length to the third dorsal; from this to the twelfth dorsal the summits of the spines are on almost the same horizontal line, and are expanded and obtuse above, sustaining the substance of the two humps of this species; the spines of the lumbar vertebræ progressively decrease in length. The diapophyses of the last six lumbar vertebræ are very long; that of the first lumbar is intermediate in length between the short diapophysis of the twelfth dorsal and the long one of the second lumbar. The spine of the scapula is produced into a short pointed acromion: the coracoid tubercle is large, and grooved below. The

ridge upon the outer condyle of the humerus is much less marked than in the normal ruminants. The ulna has coalesced more completely with the radius, and appears to be represented only by its proximal and distal extremities. The carpal bones have the same number and arrangement as in ordinary ruminants, but the pisiforme is proportionally larger. There is no trace of the digits answering to the first, second and fifth in the pentadactyle foot: the metacarpals of those answering to the third and fourth have coalesced to near their distal extremities, which diverge more than in the ordinary ruminants, giving a greater spread to the foot, which is supported by the ordinary three phalanges of each of those digits. The last phalanx deviates most from the form of that in the ordinary ruminants, by its smaller proportional size, rougher surface, and less regular form: it supports, in fact, a modified claw rather than a hoof. In the femur, the chief deviation from the ordinary ruminant type is seen in the position of the orifice of the canal for the medullary artery, which, as in the Human skeleton, enters the back part of the middle of the shaft, and inclines obliquely upwards. The fibula is represented by the irregularly-shaped ossicle interlocked between the outer side of the distal end of the tibia and the calcaneum. The scaphoid is not confluent with the cuboid as in the normal Ruminant: the rest of the hind-foot deviates in the same manner and degree from the ordinary ruminant type, as does the fore-foot.

Hunterian.

3446. The skull of a male Camel (*Camelus bactrianus*).

The occipital condyles are divided into two surfaces meeting at an acute angle, and they come in contact with each other beneath the basioccipital, which contributes an equal share with the exoccipitals to their formation. The paroccipitals are small, and shorter than the processes formed by the combined mastoid and petrosal. A deep fossa for the articulation of the stylohyal separates these processes. The occipital crest is sharp, deep, but thin; there is a low but sharp parietal crest; the zygomatic arches are longer, and span across a wider temporal fossa than in the ordinary Ruminants. The modification of this part of the skull relates to the presence of large canines in both upper and lower jaws, and also to the presence of a pair of laniariform incisors and premolars in the upper jaw. Most of the sutures of the cranium have been obliterated, including that between the maxillary and premaxillary bones. The rim of the orbit is entire; the true nature of the outermost of the eight teeth at the fore part of the lower jaw in the true ruminants is clearly shown by the maintenance of its normal form as a canine in the Camel.

Hunterian.

The following, to No. 3478 inclusive, are parts of the same skeleton of a Camel (*Camelus bactrianus*):—

Hunterian.

3447. The cranium, vertically and longitudinally bisected.

The parietes of the cranium are of unusual thickness, and, with the exception of those formed by the frontal and presphenoid, are chiefly occupied by a close cancellous structure. There is no bony tentorium. The lateral sinus bifurcates above the petrosal into two wide venous canals. The posterior canal divides, one branch terminating on the superoccipital

surface, above the mastoid, the other descending to terminate at the ordinary foramen jugulare: the anterior canal descends to the base of the zygoma, where it also divides, one division opening on the inner and the other on the outer side of the post-glenoid process. The foramen rotundum is blended with the foramen lacerum anterius. The rhinencephalic fossa is narrow but deep. The osseous septum is coextensive with the nasal bones. The maxillo-premaxillary sutures are obliterated, with the exception of a slight trace upon the palate: there is a trace of the nasomaxillary suture; all the other sutures of the cranium are obliterated.

This cranium exhibits an instance of symmetrical morbid action, the socket of the first true molar being more or less absorbed on each side. The second true molar differs from that in either of the preceding specimens, by having a columnar process at the internal interval of the two lobes of the crown.

3448. The lower jaw.

The socket of the first true molar on the right side has begun to be affected by the ulcerative absorption.

3449. The atlas.

The anterior articular cavities meet and blend together below. The transverse process is perforated twice by the vertebral artery and twice by canals extending apparently outwards from the neural canal. The transverse process extends from the anterior to the posterior articular surface as a simple ridge very slightly produced outwards.

3450. The axis.

The neural canal is widely open above between the atlas and axis. The canal for the vertebral artery in the axis commences within the neural canal and opens externally at the fore part of the transverse process. The second pair of cervical nerves perforate the fore part of the neural arch. The neural spine is represented by a rough bifid tubercle. The hypapophysis is of a similar form, but is less developed below.

3451. The third cervical vertebra.

An accessory pair of processes is developed in this vertebra from the fore part of the sides of the centrum, which descend obliquely downwards and outwards, and represent the pleurapophyses, the parts answering to the transverse processes of the atlas and axis being the diapophyses. The arterial canals commencing behind at the fore part of the neural canal open anteriorly below the bases of the zygapophyses.

3452. The fourth cervical vertebra.

This differs from the foregoing chiefly in the greater size of the pleurapophysis.

3453. The fifth cervical vertebra.

The pleurapophyses have increased; the diapophyses have diminished in length. The zygapophyses have also become shorter and thicker.

3454. The sixth cervical vertebra.

This is characterized by the base of the pleurapophysis being coextensive with the centrum: the process, descending almost vertically, forms a broad subquadrate plate: the diapophysis is a low tuberosity on the outside of its base. The hypapophysis disappears in this vertebra. The neural spine, which was wanting in the three preceding vertebræ, has here the form of a low rounded ridge. The canals for the vertebral arteries have the same peculiar position and course as in the three preceding vertebræ.

3455. The seventh cervical vertebra.

The pleurapophyses have disappeared. The diapophysial tubercles are more prominent, and project more decidedly from the base of the neural arch, which is much reduced in its antero-posterior extent. The vertebral arteries do not perforate any part of this vertebra. The posterior epiphysis of the centrum has been detached from all the cervical vertebræ save the first two, and its suture is still obvious in the axis. The anterior epiphysis, which has a convex articular surface, has become completely confluent with the centrum.

3456. The first dorsal vertebra.

This is characterized by the sudden and great elongation of the neural spine, and differs from the cervicals in the length and independency of its pleurapophyses, which it exclusively supports.

3457. The second dorsal vertebra.

In this the anterior zygapophyses have become suddenly diminished in size, and changed in their direction and position; being represented by round articular surfaces, looking upwards from the fore part of the neural arch. The metapophysial ridge now begins to be developed above the diapophysis.

3458. A middle dorsal vertebra.

Both anterior and posterior zygapophyses have almost disappeared. The metapophyses project forwards.

3459. A posterior dorsal vertebra.

The posterior costal surface has disappeared, and the metapophyses project forwards from above the anterior zygapophyses.

3460. The second lumbar vertebra.

The diapophyses have much increased in length. The metapophyses are still distinguishable from the anterior zygapophyses; the position and aspect of which become much changed by the development of the former.

3461. The fifth lumbar vertebra.

The diapophyses have increased in length, and the neural spine has diminished in height. The metapophyses can no longer be distinguished from the anterior zygapophyses.

3462. The last lumbar vertebra, with the sacrum.

In this specimen may be observed the double interlocking joints of the coadapted zygapophyses, and the depressions above the bases of the lumbar diapophyses for lodging the produced extremities of the sacral zygapophyses. The sacrum consists of five vertebræ, the tuberous spines of which are distinct. Their diapophyses have coalesced, except at the portions of their original interspaces reserved for the passage of the upper or dorsal divisions of the sacral nerves.

3463. The left scapula.

3464. The left humerus.

3465. The right humerus, longitudinally bisected.

The canal for the medullary artery commences at the fore part of the lower third of the shaft, passes obliquely inwards and downwards, and terminates at the lower end of the medullary cavity.

3466. The left coalesced radius and ulna.

The primitive division is indicated by small foramina near the two extremities of the shafts.

3467. The right coalesced radius and ulna, longitudinally bisected.

This preparation demonstrates the essential distinction of the two bones by their separate medullary cavities.

3468. The left metacarpus or 'cannon-bone.'

3469. The right metacarpus, longitudinally bisected.

It consists of the coalesced metacarpals of the digits answering to the third and fourth of the pentadactyle foot. Notwithstanding the intimate blending of the two bones apparent

externally, their medullary cavities are distinct. The canal of the medullary artery enters the back part of each, above the middle, and ascends obliquely to its respective cavity.

3470. The ossa innominata.

They are confluent at the symphysis pubis. The tuberosities of the ischia are divided into a posterior and an external prominence.

3471. The left femur.

The medullary arterial canal enters at the back part below the middle of the shaft and inclines obliquely upwards. Below this orifice there is a strong rough protuberance.

3472. The right femur, longitudinally bisected.

3473. The left tibia.

3474. The right tibia, longitudinally bisected.

3475. The left metatarsus.

It is remarkable for the strong pointed process which rises from the back part of the proximal end.

3476. The right metatarsus, longitudinally bisected.

It shows the complete double septum which divides the medullary cavities of the two coalesced bones. The arterial canals have the same position and course as in the metacarpus.

3477. The right astragalus and calcaneum.

The fore part of the astragalus is less equally divided into two facets than in the ordinary Ruminants.

3478. The left astragalus and calcaneum.

3479. The skull of the female Camel (*Camelus bactrianus*).

The last true molar in the upper jaw has not risen into place, and the deciduous canines have not been shed: the pair of laniariform upper incisors and premolars (*p* 1) are just emerging: the molariform premolars (*p* 3 and *p* 4) are not quite in place. In the lower jaw the last deciduous molar is not shed, although the last true molar has nearly risen into place. The deciduous canines are still retained, and only the first pair of permanent incisors are fully developed.

Hunterian.

3480. A partially articulated and incomplete skeleton of a Dromedary (*Camelus dromedarius*). *Mus. Brookes.*

3481. The premaxillary, maxillary and mandibular bones of the right side of a very young Dromedary, showing the deciduous teeth.

These are:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $m\,\frac{3-3}{2-2}$. The lower canine has a crown more resembling in shape that of the incisors than the corresponding permanent canine presents. The first deciduous molar ($d\,2$) has a simple crown in both jaws; the second ($d\,3$) and third ($d\,4$) deciduous molars in the upper jaw have each the double pair of crescentic lobes; the second deciduous molar in the lower jaw has three pairs of crescentic lobes, increasing in size as they are placed further back.

Genus *Auchenia.*

3482. The skeleton of the Llama (*Auchenia Llama*).

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, and 4 sacral; there are 13 caudal vertebræ, but the terminal ones are wanting. With the exception of the atlas, the cervical vertebræ, like those of the Camel, are not perforated by the vertebral arteries in the usual place, but these enter the neural canal and perforate the anterior part of the base of the neural arch on each side. The transverse process is divided into a diapophysis and pleurapophysis from the third to the sixth cervical vertebræ inclusive, and in the sixth an additional pair of processes is developed from the sides of the back part of the centrum. The fifth lumbar vertebra has the longest spine: the last bone of the sternum is not so expanded as in the Camel. The bones of the extremities repeat the same peculiarities as in the Camel.

Mus. Brookes.

The following, to No. 3487 inclusive, are parts of the same skeleton.

Presented by the Zoological Society.

3483. The axis, or vertebra dentata, of a Llama.

It shows the double perforation of the anterior part of the neural arch for the nerve and vertebral artery.

3484. The third cervical vertebra of a Llama, vertically and longitudinally bisected to show the position and extent of the canals for the vertebral arteries.

3485. A fourth cervical vertebra of the Llama.

The degree of convexity and concavity of the articular ends of the body is much less than in the Camel, and the neck is habitually straighter and carried more erect.

3486. The sixth cervical vertebra of a Llama.

It shows the pleurapophyses, diapophyses, and the posterior descending pair of processes, which resemble the hypapophyses in the lower cervical vertebræ of birds.

3487. The last cervical vertebra of a Llama.

The right transverse process is perforated by the canal for the vertebral artery.

3488. The skeleton of the Paco or Guanacho, a variety of the *Auchenia Llama*.

The vertebral formula and other characters of the skeleton correspond with those of the preceding.

Mus. Brookes.

3489. The skeleton of the Vicugna (*Auchenia Vicugna*).

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, 4 sacral, and 14 caudal, but probably one is wanting. Six pairs of ribs articulate directly with the sternum, which consists of six bones. The vertebræ of the neck repeat the peculiarities noted in the other *Camelidæ*, but are proportionally longer and more slender: the sixth has the superadded processes upon the back part of the centrum. The metapophysis passes upon the zygapophysis at the eleventh dorsal: from the fourth to the tenth it is intermediate in position between this and the diapophysis. The bones of the extremities repeat the peculiaritics of the other *Camelidæ*, but the metacarpi and metatarsi are relatively longer and more slender.

Purchased.

Genus *Moschus*.

3490. The skeleton of a male Musk-deer (*Moschus moschiferus*).

The vertebral formula is:—7 cervical, 14 dorsal, 5 lumbar, 5 sacral, and 6 caudal.

The atlas has a hypapophysis, but no neural spine. The transverse process is a broad thin plate coextensive with the length of the vertebra: it is perforated transversely from the neural canal outwards to beneath its base, for the exit of the nerve, and then vertically, by the vertebral artery, which also perforates the neural arch. The axis has a sharp hypapophysial ridge extending from below the base of the odontoid process to beyond the posterior surface of the centrum, where it underlaps the next vertebra. A similar ridge and backwardly produced proccss are developed from the two succeeding cervicals, beyond which the ridge gradually subsides to the seventh vertebra. From the third to the sixth cervical inclusive, the pleurapophysial part of the transverse process equals or exceeds the length of the vertebra, and those parts are arranged so as to overlap each other.

There is a distinct, but less extensive, diapophysial portion projecting external to the vertebral canal: this part alone represents the transverse process in the seventh cervical. The spines of the third and seventh cervical vertebræ are vertical, those of the intermediate ones

incline forwards. The spines of the anterior dorsal vertebræ are remarkable for their height; those of the posterior dorsal and of the lumbar vertebræ are remarkable for their antero-posterior extent, the anterior angle being produced forwards and overlapping the spine in advance. A distinct metapophysis begins to be developed from the second dorsal, and attains its greatest length on the twelfth. There are no anapophyses. The notches for the nerves increase in depth as the vertebræ recede in position, and in the last dorsal the neural arch is completely perforated by the spinal nerve, which is likewise the case in most of the lumbar vertebræ. Eight pairs of ribs directly articulate with the sternum, which consists of seven bones.

In the present skeleton the tubercle disappears from the penultimate pair of ribs, and the diapophysis is reduced to a short rough tuberosity; but in the last pair of ribs the costal tubercle with its articular surface reappears, and the diapophysis resumes its normal size and articulation with the rib. In the first lumbar vertebra the diapophysis suddenly increases in length and breadth, and is probably augmented by the ossified and coalesced rudiments of a rib. In the scapula both the coracoid and acromion are rudimentary. The external tuberosity of the humerus is large, and produced above or beyond the head, bounding a deep trochlear groove between it and the inner tuberosity. The humerus is perforated between the condyles. The ulna is continued uninterruptedly from the olecranon to its carpal or styloid extremity, where it has coalesced with the radius. The middle part of the interosseous space is interrupted by syndesmosis of the ulna with the radius. The two middle metacarpals are confluent, forming the cannon-bone, as in other Ruminants; but the distal portions of the two other metacarpals, answering to the second and fifth of the pentadactyle foot, are more developed than usual and support larger spurious hoofs or digits, with the ordinary number of phalanges. The medullary artery of the femur enters the fore part of the shaft near its proximal end, and inclines obliquely downwards. No trace of the metatarsals of the second and fifth digits is preserved, but the toes which they would have supported are articulated to the sesamoids behind the distal ends of the coalesced third and fourth metatarsals, by means of a short flattened proximal phalanx.

Mus. South.

3491. The skull of a male Musk-deer (*Moschus moschiferus*), with the cranial part mutilated.

It is chiefly remarkable for the great length of the canines, which are compressed, curved, with trenchant posterior margins, and project downwards considerably beyond the rami of the lower jaw.

Presented by Sir Joseph Banks, Bart., P.R.S.

3492. The skull of a Musk-deer (*Moschus moschiferus*).

The outer alveolar walls have been removed from the right side of both jaws to expose the roots of the teeth. The long upper canine is implanted by a simple undivided and widely open base, indicating its uninterrupted growth.

Presented by Colonel Finch.

3493. The anterior extremities of the upper and lower jaws, with the long upper

canines and the inferior incisors and incisor-like canines, of the Musk-deer (*Moschus moschiferus*). *Hunterian.*

Subgenus *Tragulus.*

3494. The skeleton of the Meminna Chevrotain (*Moschus Meminna*).

The vertebral formula is :—7 cervical, 13 dorsal, 6 lumbar, 5 sacral, and 13 caudal. The inferior tubercle (hypapophysis) upon the atlas and the inferior ridges upon the four succeeding cervicals are less developed than in the *Moschus moschiferus* : they have disappeared on the last two cervicals. The pleurapophysial parts of the transverse processes are less extended longitudinally in the third, fourth and fifth cervicals, but they slightly overlap each other : those of the sixth cervical are disproportionately larger and deeper : the diapophysial portion extends out as a distinct process: the pleurapophysial part of the transverse process is wanting in the seventh vertebra : the spines of the last five cervicals are longer and more slender than in the Musk-deer, and progressively increase in length, so that the last nearly equals that of the first dorsal : the spine of the tenth dorsal is that towards which those of the other trunk vertebræ converge, and there is a similar centre of motion indicated by the vertical spine of the third cervical : the metapophysial tubercle appears above the diapophyses of the anterior dorsals, projects as a distinct process midway between the diapophysis and prozygapophysis of the seventh to the tenth dorsals inclusive, and gets upon the prozygapophysis in the succeeding dorsal and anterior lumbar vertebræ, subsiding in the penultimate lumbar. The tubercle has disappeared on the tenth rib and does not reappear on those that follow, but the diapophysis continues on the last four dorsals, increasing in length upon the last two, and plainly showing the nature of the longer diapophyses in the lumbar region. The sternum consists of seven bones. The condition of the bones of the extremities closely resembles that in the Musk-deer, but there is a longer rudiment of the proximal end of the fibula, and the slender metatarsals of the two outer toes or spurious hoofs, which are preserved in the left hind foot in this skeleton, reach the tarsus.

Presented by Sir Stamford Raffles, P.Z.S.

3495. The skeleton of a male Napu Chevrotain (*Moschus Napu*).

The length of the canines gives the sexual character. The vertebral formula is the same as in the female. Eight pairs of ribs directly join the sternum, which consists of seven bones and an ensiform cartilage. The slender proximal rudiment of the fibula extends more than half-way down the tibia. The two large middle metacarpals have more completely coalesced than in the female.

Presented by Sir Stamford Raffles, P.Z.S.

3496. The skeleton of a female Napu Chevrotain (*Moschus Napu*).

The vertebral formula is :—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 13 caudal. The same characters of the skeleton as are noticed in the Meminna are repeated in the present skeleton, but the slender metacarpals and metatarsals of the spurious toes in each foot being preserved, show that they all are coextensive with those of the larger and middle pairs of digits:

the primitive division of the metacarpals of these digits continues along their distal half. The intercondyloid perforation of the humerus is reduced to a minute foramen.

Mus. South.

3497. The skeleton of the Javan Chevrotain (*Moschus javanicus*).

The vertebral formula is :—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 11 caudal. The diminutive size of the canines indicates the female sex.

Presented by Sir Stamford Raffles, P.Z.S.

3498. The skeleton of the Kanchil Chevrotain (*Moschus Kanchil*).

The vertebral formula is :—7 cervical, 13 dorsal, 6 lumbar, 5 sacral, and 13 caudal. Eight pairs of ribs directly join the sternum, which consists of seven bones and an ensiform cartilage. From the length of the canines, this was probably a male and an aged animal, if we may judge from the bone-tendons, which have extended from the ossified origin of the sacro-lumbalis and longissimus dorsi into the substance of those muscles. The metapophysis leaves the diapophysis at the eighth vertebra, and attains the zygapophysis at the tenth vertebra. The diapophysis is a mere ridge on the eleventh dorsal; it is a tubercle in the twelfth, and becomes a distinct triangular process on the thirteenth dorsal. The intercondyloid perforation of the humerus has been very minute. The broad suprascapular cartilage is partially ossified.

Purchased.

3499. The skeleton of a young Pigmy Chevrotain (*Moschus pygmæus*).

The vertebral formula is :—7 cervical, 14 dorsal, 6 lumbar: only two vertebræ are, as yet, anchylosed to form a sacrum, and these are succeeded by eleven other vertebræ, but the end of the tail is wanting. The seventh lumbar shows, by its long and anteriorly-produced diapophyses, that it is not the homologue of the first sacral of the other Chevrotains detached, but that a supernumerary trunk-vertebra with a pair of free ribs has actually been superadded. This may be an individual anomaly or variety, like the cases of the thirteenth dorsal or the sixth lumbar vertebra occasionally developed in the Human subject. In this specimen all the deciduous grinders are retained, with the first true molar on each side. The first and second milk-molars in the upper jaw have three subcompressed, pointed, conical cusps, the middle one being the largest. The third upper milk-molar has two pairs of thicker conical cusps like the true molar that is behind it. In the first milk-molar of the lower jaw the anterior of the three cusps is obsolete; the second lower milk-molar has the three compressed pointed cusps like its homotype above; the third lower milk-molar has three pairs of cusps resembling the last true molar.

Hunterian.

3500. A mutilated skull with the bones of the feet of the Napu Chevrotain (*Moschus Napu*).

The small canines indicate the female sex. The characters of the crowns of the permanent series of teeth are well shown.

Presented by Sir Everard Home, Bart., V.P.R.S.

3501. The left ramus of the lower jaw of the same species of Chevrotain, with the roots of the grinders exposed.

Presented by Prof. Owen, F.R.S.

3502. The skull of a young Pigmy Chevrotain (*Moschus pygmæus*), showing the deciduous series of teeth. *Hunterian.*

Genus *Alces.*

3503. The skeleton of a male American Elk (*Alces Machlis*, var. *americana*).

The vertebral formula is :—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 11 caudal, the terminal one, perhaps, being wanting. Eight pairs of ribs directly join the sternum, which consists of seven bones : these bones, as in other Ruminants, increase in breadth and decrease in depth as they extend backwards : there is no manubrial process, there being no clavicles. The transverse process of the atlas is perforated vertically by the vertebral artery, which afterwards perforates the neural arch : there is a hypapophysial tubercle. In the three succeeding cervicals the hypapophysis forms a ridge ; in the fifth it becomes a tubercle ; in the sixth it has disappeared. The pleurapophysial part of the transverse process extends downwards and forwards from the third to the sixth cervical inclusive, in which it forms a broad compressed plate. In the seventh cervical the transverse process is represented by the diapophysis only, and consequently is imperforate : the spine of this vertebra suddenly enlarges both in height and antero-posterior extent ; but that of the first dorsal is nearly double its dimensions, and is itself exceeded in length by the spines of the four following dorsals, after which the spines rapidly shorten. The metapophysial ridge becomes distinctly developed in the eighth dorsal, is a tubercle in the ninth, forms a process exceeding in length the diapophysis in the tenth and eleventh dorsals, and subsides to a tuberosity in the twelfth and succeeding vertebræ, where its position has changed from the diapophysis to the zygapophysis. There is a slight trace of an anapophysis in the last lumbar vertebra. The spine of the scapula terminates in a right angle, which is not produced into an acromion : the coracoid is a low tuberosity. The humerus is entire between the condyles. The ulna is continued to the carpus, and its distal extremity only is anchylosed with the radius. The slender rudiments of the outer (second) and inner (fifth) metacarpals extend two-thirds up the coalesced middle (third and fourth) metacarpals : a small sesamoid bone between the magnum and inner coalesced metacarpal may represent the trapezoides. The medullary artery enters the fore part of the shaft of the femur, near its proximal end, and the canal goes downwards and backwards. The fibula is represented by its distal epiphysis only, which is wedged between the tibia and calcaneum. The scaphoid is confluent with the cuboid. There is a rudiment of the middle cuneiform bone, answering to the trapezoid in the carpus. The digits answering to the second and fifth are represented by the phalanges only, the proximal of which is a short compressed bone, articulated to the trochlear sesamoids behind the joint of the coalesced metatarsals of the two large middle toes, answering to the third and fourth.

The animal from which this skeleton was prepared was presented by the Trustees of the British Museum.

3504. Two skulls of the American Elk (*Alces*, var. *americana*).

The history of these skulls, according to a memorandum left by Mr. Hunter, is as follows:—"They are from North Carolina; and the animals to which they belonged were two large males, which, in the season when sexual excitement is strong, becoming pugnacious, were engaged in fighting, and their horns, as usual, employed as weapons of offence: these, by violent contact, became so firmly locked within each other, by means of their points or snags, that the animals were incapable of liberating themselves; and in this state they were discovered, starved to death."

Hunterian.

3505. The facial part of the skull, with the lower jaw, of an Elk (*Alces*, var. *americana*).

The accessory tubercle at the inner interspace of the two lobes of the upper molar teeth is short and simple. The chief peculiarity of this portion of the skull is seen in the great length of the premaxillaries and of the edentulous portion of the maxillaries, and in the shortness and breadth of the nasal bones. The vomer is carinate beneath.

Hunterian.

3506. A pair of antlers of an American Elk (*Alces*, var. *americana*). *Hunterian.*

3507. A pair of antlers of an American Elk (*Alces*, var. *americana*).

These antlers present an unusual appearance from being duplex in the palm.

Hunterian.

3508. An antler of an American Elk (*Alces*, var. *americana*).

Presented by Sir Everard Home, Bart., V.P.R.S.

3509. The skeleton of a young male Elk (*Alces Machlis*, var. *europæa*).

The antlers are short, bifurcate, not having developed the broad palm. This is stated to be a 'European Elk'; but there are no specific differences in the skeleton or teeth from the American variety.

Mus. Brookes.

3510. A mutilated cranium and antlers of an European Elk (*Alces*, var. *europæa*).

Hunterian.

3511. A pair of antlers of an European Elk (*Alces*, var. *europæa*). *Hunterian.*

Genus *Cervus.*

Subgenus *Rangifer.*

3512. The skeleton of a male Rein-deer (*Cervus tarandus*).

The vertebral formula is :—7 cervical, 14 dorsal, 5 lumbar, 4 sacral, and 11 caudal. The pleurapophyses of the third, fourth and fifth cervicals are developed forwards as well as backwards; those of the sixth are also of great breadth, and are more produced downwards. The metapophysis is distinctly developed upon the second and succeeding dorsal vertebræ, and attains the outside of the zygapophysis in the eleventh. All the dorsal ribs are biarticulate, retaining both head and tubercle. Eight pairs of ribs directly join the sternum, which consists of seven bones. The shaft of the ulna is anchylosed to the radius, but the extremities remain distinct from that bone. The medullary artery enters the fore and upper part of the shaft of the femur, and the canal inclines downwards and backwards. The distal epiphysis is the only part of the fibula retained in the present skeleton. Styliform rudiments of the metacarpals of the spurious digits (second and fifth in the pentadactyle foot) are present in the fore feet, but the phalanges only are preserved of the corresponding digits in the hind feet.

From Norway.

Presented by Sir Thomas Marion Wilson, Bart.

3513. The skeleton of a female Rein-deer (*Cervus tarandus*).

The vertebral formula agrees with that of the male, except that there are 5 sacral vertebræ. The Rein-deer is one of the few species of *Cervidæ* in which the female developes antlers: they are always smaller than in the male, and, in the present skeleton, show the long and slender brow-snag, which is bifurcate on the right side, and two short branches from the beam.

From Norway.

Presented by Sir Thomas Marion Wilson, Bart.

3514. The skeleton of a female Rein-deer (*Cervus tarandus*).

The vertebral formula is:—7 cervical, 14 dorsal, 5 lumbar, and 5 sacral: of the caudal vertebræ only 8 are preserved. The six anterior cervicals have hypapophyses in the form of a tubercle or a ridge. Nine pairs of ribs directly join the sternum, which consists of seven bones. The ulna is continued, as in the foregoing skeletons, from the olecranon to the carpus, where it forms the external styloid process, and has become confluent there and at the middle of the shaft with the radius. The metacarpals of the spurious hoofs are limited to their distal portions, which do not extend so far up as the middle of the confluent metacarpals of the two large and fully-developed digits. The groove behind the coalesced metacarpals is wide and unusually deep; it is scarcely indicated on their fore part. In the coalesced metatarsals the groove is well-marked, both before and behind, where it is also of great depth and width. The medullary artery enters the femur at the fore part of the beginning of the shaft. There is a rudiment of the proximal end of the fibula in the form of a styli-

form process, as well as the distal epiphysis which constitutes the ossicle between the tibia and the calcaneum. The antlers here show long bifurcate brow-snags and three branches from the beam. The use to which they are put in removing the snow from the lichens which constitute the winter food of the Rein-deer, gives a final purpose for the existence of the antlers in both sexes.

From Lapland.

Presented by William Bullock, Esq.

3515. The skull and antlers of a male Rein-deer (*Cervus Tarandus*).

The antlers spring from within an inch of the superoccipital crest, and the frontal bones are proportionably extended backwards on each side of the quadrate parietal, in which the sagittal suture is obliterated: the frontal suture is persistent, and is complex in its dentations at its posterior half. The large lacrymal presents two canals upon its orbital border and a deep oblong depression on its facial surface, above which is a vacuity between the frontal, nasal, and maxillary, leading to the olfactory chamber. The right antler has developed a long brow-snag, palmated and branched at its extremity; that of the left antler is a simple short styliform process, its place being supplied by the first branch from the beam. It is directed unusually forwards.

From Lapland.

Presented by Mr. Leadbeater.

3516. The skull and antlers of a male Rein-deer (*Cervus Tarandus*).

The parietal bone has both its anterior angles produced in the form of narrow pointed processes into corresponding notches of the frontal. In this skull also the left brow-snag is simple or unbranched, but it is almost as long as the right, which shows the normal character.

From Lapland.

Presented by William Bullock, Esq.

3517. The cranium and antlers of a young male Rein-deer (*Cervus Tarandus*).

In this specimen also the left brow-snag is simple, but is as long as the right, which has the normal palmated and branched form.

From Greenland.

Hunterian.

3518. The calvarium and antlers of a young male Rein-deer (*Cervus Tarandus*).

The left brow-snag is simple, styliform, and about half the length of the right, which presents the normal form.

From Lapland.

Presented by William Bullock, Esq.

3519. The antlers of a male Rein-deer (*Cervus Tarandus*), at the prime of maturity.

Both brow-snags are equally developed with compressed branched palms.

From Siberia.

Hunterian.

3520. An antler of an old male Rein-deer (*Cervus Tarandus*).

The palmated branches are broad in proportion to their length, which is much curtailed, with the exception of the brow-snag. The terminal divisions or points of this antler are thirty-seven in number.

From Siberia.

Hunterian.

3521. The skull of a male Rein-deer (*Cervus Tarandus*), with the antlers removed.

The parietal is triangular, and its apex advances forwards between the frontals. Almost all the frontal suture is simple. The rudimentary canines are preserved in the sockets behind the premaxillary suture.

Hunterian.

3522. The skull of a Rein-deer (*Cervus Tarandus*).

The antlers have been shed, and the short pedicels terminate in a slightly convex surface. The premaxillaries do not attain the nasals. The rudimentary canines have not been preserved in their sockets.

Hunterian.

3523. The left antler of a male Rein-deer (*Cervus Tarandus*).

It has been shed.

Hunterian.

3524. The right antler of a male Rein-deer (*Cervus Tarandus*).

The brow-snag is long, palmated and branched, as usual.

From Lapland.

Presented by William Bullock, Esq.

3525. The calvarium and antlers of a female Rein-deer (*Cervus Tarandus*).

The antlers are of small size, characteristic of the sex, with their brow-snags, especially the right one, disproportionately developed.

From Lapland.

Hunterian.

3526. The calvarium and antlers of a female Rein-deer (*Cervus Tarandus*).

The left brow-snag is longer and larger than the right. The beam is less curved than usual in both.

From Greenland.

Hunterian.

3527. Part of the calvarium and antlers of a female Rein-deer (*Cervus Tarandus*).

The right brow-snag is longer and stronger than the left.

From Lapland.

Hunterian.

3528. The calvarium and antlers of a female Rein-deer (*Cervus Tarandus*).

From Lapland.

Presented by William Bullock, Esq.

3529. Part of the calvarium and antlers of a female Rein-deer (*Cervus Tarandus*).

The left brow-snag is much smaller than the right one.

Hunterian.

3530. The left antler of a female Rein-deer (*Cervus Tarandus*), with the brow-branch well developed. *Hunterian.*

3531. The calvarium and the growing antlers of a Rein-deer (*Cervus Tarandus*).

The beam is nine inches in length, but the burr is not formed.

Presented by William Bullock, Esq.

3532. Part of the antler of a Rein-deer (*Cervus Tarandus*), showing two branches from the base beside the brow-branch. The summit of the antler has been removed. *Hunterian.*

3533. The tarsus, metatarsus and phalanges of the left hind leg of a Rein-deer (*Cervus Tarandus*). *Mus. Brit.*

3534. The head and antlers of a male of the large variety of Rein-deer called 'Carabou' (*Cervus Tarandus*).

The right brow-snag is much expanded vertically, and palmate: the left one is bifurcate, the prongs being long, round and simple. The front branch of the beam and the termination of the beam are palmate.

From Newfoundland.

Presented by Edward E. Rushworth, Esq.

3535. A single antler of a male Carabou Rein-deer (*Cervus Tarandus*).

From North America.

Hunterian.

Subgenus *Dama*.

3536. The skeleton of the Fallow-deer (*Cervus Dama*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral; the caudal series is incomplete. Eight pairs of ribs directly join the sternum, which consists of seven bones: the atlas has the hypapophysis in the form of a tubercle; the five following cervicals have it

in the shape of a ridge. The ulna is continued from the olecranon to the carpus. The canal of the medullary artery enters the femur at the upper and fore part of the shaft, and inclines downwards. The metapophysis passes abruptly from its situation on the diapophysis in the twelfth dorsal to above the zygapophysis in the thirteenth. The last cervical is imperforate at its transverse process, which consists of the diapophysis only. The cannon-bones are less deeply grooved than in the Rein-deer.

Hunterian.

3537. An incomplete skeleton of a young male Fallow-deer (*Cervus Dama*).

The vertebral formula is the same as in the preceding specimen.

Mus. South.

3538. The skull of a male Fallow-deer (*Cervus Dama*).

The frontal bones do not extend so far back as in the Rein-deer, and the antlers, in consequence, rise at a greater distance from the occipital crest. The lacrymal bone has two perforations at its outer border, and its facial plate is nearly equally divided into an upper convex and a lower concave surface.

Hunterian.

3539. The skull of a male Fallow-deer (*Cervus Dama*).

The antlers have been sawed off above the burr, and the teeth removed from one side of both jaws. The external lacrymal fossæ are entire. The canal at the base of the zygoma for the venous sinus, which perforates the squamosal, is well shown.

Hunterian.

3540. The skull of a male Fallow-deer (*Cervus Dama*).

The antlers have been shed, and the short pedicels terminate in slightly concave surfaces. The premaxillaries attain the nasals. There are no rudimentary canines or alveoli for such.

Presented by His Grace the Duke of Marlborough.

3541. The cranium of a male Fallow-deer (*Cervus Dama*).

The depression in the facial plate of the lacrymal is larger and deeper than in the preceding skull, and communicates by a perforation with the olfactory chamber.

Purchased.

3542. The cranium, longitudinally bisected, of a Fallow-deer.

The constituent bones are numbered on coloured labels according to the TABLE OF SYNONYMS.

Presented by Prof. Owen, F.R.S.

3543. The cranium of a Fallow-deer (*Cervus Dama*).

The antlers are fully developed, but 'in velvet,' that is, prior to the shedding of the vascular integument subservient to their growth.

Hunterian.

3544. Portion of the calvarium, with the antlers, of a Fallow-deer (*Cervus Dama*).

The animal has been killed before the hairy integument or 'velvet' has been shed.

Hunterian.

3545. The growing antlers of a Fallow-deer (*Cervus Dama*), with the 'velvet' retained and dried upon them.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3546. A pair of shed antlers of a Fallow-deer (*Cervus Dama*).

The bases below the burr, where the process of separation has taken place, are convex.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3547. The left antler of a young Fallow-deer (*Cervus Dama*).

It has been shed, and the convexity of the base shows it to have been from a perfect or non-castrated buck.

Hunterian.

3548. An antler of a young Fallow-deer or 'Pricket' (*Cervus Dama*).

Presented by Robert Hills, Esq.

3549. An antler of a Fallow-deer (*Cervus Dama*). *Hunterian.*

3550. An antler of a Fallow-deer (*Cervus Dama*). *Hunterian.*

3551. An antler of a young Fallow-deer (*Cervus Dama*). *Hunterian.*

3552. An antler of a young Fallow-deer (*Cervus Dama*). *Hunterian.*

3553. The antlers of a Fallow-deer, ten years old, showing their diminished bulk and deterioration as offensive weapons in old age.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3554. A section of the cranium, including the left nasal, maxillary, premaxillary, with part of the palatine, frontal, malar and lacrymal bones, and the upper molar teeth, of the Fallow-deer (*Cervus Dama*).

The first and second molars present a tubercle at the inner interspace of the two lobes.

Hunterian.

3555. A section of the left ramus of the lower jaw of the same Fallow-deer, with the molar series. *Hunterian.*

3556. The bones of the anterior extremity of a Fallow-deer (*Cervus Dama*). *Hunterian.*

3557. The bones of the posterior extremity of the same Fallow-deer. *Hunterian.*

3558. The antlers of a Fallow-deer (*Cervus Dama*), from which half of each testicle had been removed soon after birth.

These were shed when the animal had passed its fourth year. The absorbing process has excavated the base of each antler above the level of the burr, leaving a rough flat surface. The antlers were annually formed and shed in this instance, but without acquiring their normal size, and with the difference in the degree and direction of the absorbent action exhibited by the base of the present specimens as compared with No. 3544. It is observed by the Keeper at Oulton Park, that bucks, semicastrated, as in the present instance, go into rut, but not to that degree which produces emaciation, as in entire bucks.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3559. The antlers of a Fallow-deer (*Cervus Dama*), from which the testes, but not the spermatic cords, had been removed soon after it was born.

The antlers were formed and shed annually in this instance: they differed from those of the entire deer in being somewhat smaller and retained longer: when shed, the absorbed surface at the base of the antler was always carried internally above the level of the burr, and was flat or slightly concave. The present pair of antlers were shed when the 'hevier,' as such castrated bucks are termed, was five years old.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3560. The left antler of the same castrated Fallow-deer (*Cervus Dama*), which was killed in its sixth year, October 25th, 1837.

The antlers had retained their velvet full two months longer than the entire bucks usually do in the same park (Oulton, Cheshire).

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3561. The antlers of a Fallow-deer (*Cervus Dama*).

They were shed in October 1837; the buck having been castrated in the month of August in the same year, when the same antlers were clean or burnished; that is, had cast their vascular integument. The effect of castration upon these appendages was manifested by their speedy fall and by the activity of the absorbent process producing it, which has left a slightly con-

cave surface at the base of each. Under ordinary circumstances the antlers would have been retained until the end of April in the following year.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3562. The shed antlers of a castrated Fallow-deer (*Cervus Dama*).

They are of diminutive size and abnormal form, and illustrate, by the excavation at their base, the active absorbent process through which they were cast off.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3563. A shed left antler of a castrated Fallow-deer (*Cervus Dama*).

The absorbent process by which it was undermined has extended above the level of the burr as far as the base of the brow-snag.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3564. One of a pair of antlers that were put up by a castrated buck and retained.

Both were small and unbranched, and showed the influence of the persistent vascular periosteum and integument by the formation of several irregular tubercles of bone.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3565. A shed antler of stunted growth of a castrated Fallow-deer (*Cervus Dama*).

The absorbent process has excavated the base of the antler and detached it from above the level of the burr.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3566. The antlers of a castrated Fallow-deer eight years old.

They were developed after castration, and were retained two years before the animal was killed.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3567. The calvarium and antlers of a castrated Fallow-deer (*Cervus Dama*).

The antlers were retained long after the usual period of shedding, and had become much malformed by exostoses developed from the persistent periosteum.

Presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3568. The cranium of a Fallow-deer (*Cervus Dama*), from which the left testis had been removed, showing a corresponding arrest of development of the left antler.

The velvet was retained longer than usual on both antlers. The arteries have been injected, showing the branch of the external carotid which passes over the zygoma and behind the orbit for the supply of the periosteum and integument of the antlers. The calvarium has

been removed to show the plexus or 'rete mirabile' formed by the internal carotid on each side of the 'sella turcica.'

Prepared from a specimen presented by Sir Philip de Malpas Grey Egerton, Bart., M.P.

3569. Part of the calvarium, with the antlers, of a mature Fallow-deer (*Cervus Dama*), with the integument or velvet retained.

The memorandum with this specimen states that "they were not shed at the usual time in consequence of the castration of the animal, from which period that process ceases."

Obs.—Neither the place nor date of the operation is mentioned. The latter part of the statement seems to have been made in accordance with the current belief in the effect of castration from the time of Redi, who states, "Si cervus juvenis castretur, nondum emissis cornubus, cornua nunquam emittit: si castretur jam emissis cornubus, cornua nunquam mutat; sed quæ dum castratur habet, castratus semper retinet." (Experimenta Naturalia, 12mo, 1675, p. 162.)

That these propositions are not in accordance with nature, at least as regards the Fallow-deer (*Cervus Dama*), is proved by the experiments instituted by Sir Philip de Malpas Grey Egerton, Bart., of which the specimens Nos. 3558 to 3568 are the results. No. 3561, for example, shows that the antlers which the buck had when it was castrated, instead of being always retained, were shed six months sooner than usual, the effect of the operation having been to stimulate the absorbent action which the base of the antlers shows to have gone on with unusual activity. Specimen No. 3559 also disproves the first part of Redi's statement, showing that when a young buck is castrated before it has developed any antlers it nevertheless does develope them, although of abnormal size and shape, and that they are retained longer than usual, but in some instances are shed and renewed;—always, however, when shed exhibiting the characteristic excavation at the base noticed in the specimens No. 3562.

Presented by Sir Everard Home, Bart., V.P.R.S.

3570. The cranium and antlers of a Virginian Deer (*Cervus Virginianus*).

The antlers are at their full state of development: the beam bifurcates about eight inches from its base, and each branch again bifurcates.

Purchased.

3571. The calvarium and antlers of a Virginian Deer (*Cervus Virginianus*).

Mus. Leverian.

3572. A calvarium and antlers, which had not shed their velvet, of a Deer, resembling in the general characters of the antlers the *Cervus Virginianus*.

The beam bifurcates and each branch again bifurcates, excepting the anterior one on the right side, which developes a third snag. A tubercle or rudimental snag may be observed upon the beam before its division in No. 3570: the corresponding process on the right antler of the present specimen is more developed. The beam is compressed and thins off to an edge anteriorly, the whole antler being much shorter in proportion than those of the preceding

specimen, although the interspace between their origins and their distance from the occipital ridge is the same: their growth, however, had not been completed when the animal was killed. The difference in the antlers may be accounted for partly from this circumstance, and still more by a difference in the age of the specimens. In the 'Osteological Catalogue' of 1831 these antlers are entered as belonging to a 'Young American Elk,' but a comparison with No. 3509 will show how widely they differ from the form of the antlers of the young of that species, as well as in their relative position to the occipital ridge, which is so strongly developed in the present specimen, as to indicate that it belonged to a very old rather than a very young animal.

Mus. Leverian.

3573. An antler which, in the bifurcation of its beam and the proportions of its brow-snag, approaches nearest to the type of the antler of the *Cervus Virginianus.*

The following is the copy of a label which was attached to it:—"No. 171. This horne grew in the frontlet of a Doe in New England in America, 1607."

Mus. Brit.

3574. The skull and antlers of a species of Deer, nearly allied to the *Cervus Virginianus,* but smaller.

From Guiana.

Purchased.

Subgenus *Strongyloceros.*

3575. The calvarium and antlers of a Red Deer (*Cervus Elaphus*).

Each antler has five snags or branches.

Hunterian.

3576. The right antler of a more mature Red Deer (*Cervus Elaphus*).

The summit has begun to take on the form which the foresters call the 'crown.' This antler numbers seven snags: it has been naturally shed.

Hunterian.

3577. The right antler of a Red Deer (*Cervus Elaphus*).

It has no branch between the base and the crown, but developes two long and one short snags from the base, and three branches and two short points from the crown.

Hunterian.

3578. The right antler of a Red Deer (*Cervus Elaphus*).

It closely resembles No. 3576, but is somewhat smaller. This was obtained from a bog in Ireland. It had not been shed.

Presented by the Rt. Hon. the Earl of Enniskillen.

3579. A pair of antlers of a young Red Deer (*Cervus Elaphus*).

They have each a long brow-branch: the beam of one is bifurcate, in the other it is simple. These antlers have been broken off the cranium, not shed.

Hunterian.

The following bones, to No. 3584 inclusive, are of the Red Deer (*Cervus Elaphus*):—

Presented by the Rt. Hon. the Earl of Selkirk.

3580. The atlas.

3581. A lumbar vertebra.

3582. The coalesced metacarpals, or cannon-bone of the fore-foot.

3583. The left tibia.

3584. The coalesced metatarsals, or cannon-bone of the hind-foot.

3585. The skull and antlers of the Wapiti-deer (*Cervus canadensis*).

The canines are well-developed in the upper jaw.

Purchased.

3586. The antlers of the Wapiti-deer (*Cervus canadensis*). *Mus. Leverian.*

3587. The shed antlers of the Wapiti-deer (*Cervus canadensis*).

Presented by the Zoological Society of London.

Subgenus *Hippelaphus.*

3588. The skull and antlers of a Rusa-deer, or Water Stag (*Cervus equinus*).

The accessory column at the inner interspace of the two lobes of the upper true molars presents a triradiate form of the grinding surface, and consists of dentine with a complete investment of enamel. The antlers are supported upon pedicles upwards of an inch in length, and bifurcate between two and three inches above the burr. The posterior fork or continuation of the beam sends off a short snag from its back part before it diminishes to a point. The lacrymals are deeply impressed by the large antorbital cutaneous fossæ, and communicate by numerous perforations at the bottom of the fossæ with the nasal cavities.

This specimen is from Sumatra, and was probably transmitted to Mr. Hunter by his former assistant, Mr. William Bell.

Hunterian.

3589. The calvarium and antlers of the Rusa-deer (*Cervus equinus*).

The length of the beam, from the brow-branch to its own bifurcation, is sixteen inches and a half.

From the Coromandel coast.

Hunterian.

3590. The calvarium and antlers of the Rusa-deer (*Cervus equinus*).

Presented by Sir Stamford Raffles, P.Z.S.

3591. The calvarium and antlers of the Rusa-deer (*Cervus equinus*).

Presented by Sir Stamford Raffles, P.Z.S.

3592. An antler of the Sámber-deer (*Cervus Hippelaphus*).

From the Himalayan mountains.

Presented by Colonel Finch.

Subgenus *Axis.*

3593. The skull and antlers of the Axis-deer (*Cervus Axis*).

From the Himalayan mountains.

Presented by Colonel Finch.

3594. The calvarium and antlers of the Axis-deer (*Cervus Axis*?).

A younger specimen, allied to, but less than, the *Cervus porcinus.*

From the Himalayan mountains.

Presented by Colonel Finch.

3595. The calvarium and antlers of a Hog-deer (*Cervus porcinus*).

The antlers measure, from the burr, fourteen inches in length: they are raised on short pedicles covered by the ordinary skin. The brow-snag springs from the beam above the burr at an acute angle, and the point is slightly inclined inwards. The beams of the two antlers slightly diverge outwards and backwards as they ascend, and at one-third from their summits bend inwards, and send off a slender branch, which inclines inwards and backwards. The entire length of this species of Deer, from the nose to the tail, is four feet eight inches.

It is from the Tarrai, at the foot of the Kemaon mountains, and is also found in Assam.

Purhcased.

3596. The antlers of a Deer, called Dwarf Axis (*Cervus Pumilio*) in the 'Osteological Catalogue' of 1831.

They belong to a species of the subgenus typified by the *Cervus mexicanus* or *C. cayennensis.* They have a bony stem or pedicle of nearly an inch in length: the burr is not much

developed. There is a small vertical snag in front, which diverges slightly from the beam: this is compressed or flattened laterally, and terminates in a point. The length of the horns, measured from the burr, is unequal, the right being two inches and three-quarters, and the left, three inches and a half.

Hunterian.

3597. One of the antlers of a Manilla Deer (*Cervus canaliculatus*).

The external surface is unusually deeply channelled and rugous. The first snag diverges at an acute angle from the beam, three inches above the burr. The beam sends off a short and small snag from its back part, before it tapers to an obtuse point.

From Manilla.

Presented by Hugh Cuming, Esq., F.Z.S.

Subgenus *Capreolus.*

3598. The skeleton of a male Roe-deer (*Cervus capreolus*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral: the caudal series is incomplete.

Mus. Brookes.

3599. An incomplete skeleton of a Roe-deer (*Cervus capreolus*). *Hunterian.*

3600. The antlers of a young Roe-deer (*Cervus capreolus*). *Hunterian.*

3601. The antlers of a young Roe-deer (*Cervus capreolus*). *Hunterian.*

3602. The antlers of a young Roe-deer (*Cervus capreolus*). *Hunterian.*

3603. The antlers, somewhat malformed, of a Roe-deer (*Cervus capreolus*).

Mus. Brit.

3604. An antler of a Roe-deer (*Cervus capreolus*). *Mus. Brit.*

3605. An antler of a variety of the Roe-deer, called the Tail-less or Tartarian Roe (*Cervus capreolus*; *Cervus pygargus,* Pallas).

Subgenus *Prox.*

3606. The skull of the Barking-deer, or Muntjak (*Cervus Muntjak*).

It is remarkable for the great length of the pedicles which support the antlers, and which are continued from two strong ridges that traverse the outer side of the frontal bone from its junction with the nasal bones backwards. The lacrymal bone presents a deep and well-marked fossa, and there is a vacuity anterior to it, bounded by the frontal, nasal, and superior maxillary. The upper canines are largely developed in this species: they project downwards with a slight curve, and backwards, and have a sharp posterior edge.

Hunterian.

3607. The skull and antlers of the Barking-deer (*Cervus Muntjak*).

The antlers are somewhat larger and the canines smaller. The teeth are much worn; the enamel ridges of the first true molar being quite obliterated, showing it to be an aged individual. The vacuities in front of the lacrymal bones remain.

From the Himalayan mountains.

Presented by Colonel Finch.

3608. The calvarium and antlers of a Barking-deer (*Cervus Muntjak*).

Presented by Sir Stamford Raffles, P.Z.S.

3609. The calvarium and antlers of a Barking-deer (*Cervus Muntjak*).

There is only a rudiment of a brow-snag on the short deciduous antlers.

Purchased.

3610. A mutilated cranium, with the antlers, of a large specimen of Barking-deer (*Cervus Muntjak*).

The entire series of the permanent molar teeth of the upper jaw is preserved. The persistent pedicles of the short deciduous antlers are rather more divergent than in other specimens.

Presented by Sir Everard Home, Bart., V.P.R.S.

3611. A mutilated skull of a Barking-deer.

A longitudinal section has been made of one of the antlers and its pedicle.

Hunterian.

3612. The skull of a female Barking-deer (*Cervus Muntjak*).

It bore the label *Cervus Rutwa,* and was stated to have been shot at Natmuthal. The two diverging ridges are developed above the outer margins of the frontal, but subside when they send down the postorbital process. There is a socket for a small canine in each maxillary bone.

Purchased.

3613. The skull and antlers of a young male Barking-deer (*Cervus Muntjak*).

The cranium has been transversely divided anterior to the coronal suture.
From the Himalayan mountains.

Presented by Colonel Finch.

3614. The skull of a young female Barking-deer (*Cervus Muntjak*).

From the Himalayan mountains.

Presented by Colonel Finch.

3615. A somewhat mutilated skull of a variety of the Barking-deer (*Cervus Muntjak*), for which Professor De Blainville proposed the specific name of *Cervus moschatus*.

The antlers appear to have been in process of development, for the burr is not formed, nor is the beam forked. The external ridge of the malar bone is thicker and more prominent than in the continental species. In the upper jaw, although the true molars are in place, the last having been recently acquired, the last two deciduous molars (*d* 3 & *d* 4) have not been shed.

From Sumatra.

Hunterian.

3616. The calvarium and antlers of a younger specimen of the same variety of *Cervus Muntjak*.

From Sumatra.

Presented by Sir Stamford Raffles, P.Z.S.

Genus *Camelopardalis*.

3617. The skeleton of a young male Nubian Giraffe (*Camelopardalis Giraffa*).

The vertebral formula is:—7 cervical, 14 dorsal, 5 lumbar, 4 sacral, and 20 caudal. The vertebral artery perforates the fore part of the neurapophysis of the atlas twice, vertically and transversely: the atlas has a hypapophysis: this process in the dentata is a long thin ridge: the upper and fore part of the transverse process is perforated by the vertebral artery in this and the succeeding cervicals: a pair of exogenous processes is developed from the under and fore part of the body in the third to the seventh cervical inclusive: the second to the sixth are remarkable for their length. Seven pairs of ribs directly join the sternum, which consists of six bones. The spine of the scapula forms a very low angle, and gradually subsides as it approaches the neck of the scapula: the coracoid is a large tuberosity. The slender shaft of the ulna is interrupted at its lower third, the distal end reappearing as a distinct part. There are no rudiments of the spurious digits, or those answering to the second and fifth: the cannon-bones are remarkable for their great length in both fore and hind limbs. The medul-

lary artery enters the fore part of the upper third of the shaft of the femur: the expanse of the distal end of this bone is remarkable. The scaphoid and cuboid have coalesced in the tarsus, as in other true Ruminants. The osseous bases of the horns are articulated by synchondrosis over the coronal suture to both frontal and parietal bones. The grinding teeth in place consist of the three milk-molars (*d* 2, *d* 3, *d* 4) and the first and second true molars (*m* 1, *m* 2), with part of the third (*m* 3), which has almost come into place.

Purchased.

3618. The skull of a male Cape Giraffe (*Camelopardalis Giraffa*).

The exoccipitals form a marked protuberance above the foramen magnum and below a deep fossa for the implantation of the ligamentum nuchæ. The parietals are chiefly situated on the upper surface of the skull; the osseous horn-cores, which were originally distinct, have been anchylosed, across the coronal suture, equally to the parietals and frontals: the right one is divided longitudinally, to show the extension of the frontal and parietal sinuses into its lower fourth, the rest of the horn-core being a solid and dense bone. The protuberance upon the frontal and contiguous parts of the nasal bones is entirely due to an enlargement of those bones, and not to any distinct osseous part: its surface is roughened by vascular impressions. The lacrymal is separated from the nasal by a large vacuity intervening between those bones, the frontal and the maxillary. The premaxillaries, which are of unusual length, articulate with the nasals: all the permanent teeth have been acquired, except the canines, which were cutting the gum. The alveolar processes of the upper jaw have been divided by a horizontal section, exposing the antrum or sinuses of the maxillaries. The petro-tympanic is a separate bone. The symphysis of the lower jaw is unusually long and slender.

This specimen, with some of the cervical vertebræ, and cylindrical bones of the extremities, together with the skin, which is stuffed and has been transferred to the British Museum, were brought to England by Lieut. William Paterson, who had been sent by the Hon. Lady Strathmore on a botanical expedition into Caffraria and other parts of Africa, till then unexplored, and were by her Ladyship presented to Mr. Hunter.—*Vide* Paterson's 'Narrative of Four Journeys into the Country of the Hottentots in 1777, 1778, 1779,' p. 126.

Hunterian.

3619. The skull of a female Giraffe (*Camelopardalis Giraffa*).

All the permanent teeth are in place: the base of the cranium has been removed, exposing the cranial cavity and the large air-cells of its parietes. The chief sexual distinction is seen in the smaller proportional size of the horn-cores, which retain their independence, and well display their relations to the frontal and parietal bones.

Mus. Brookes.

3620. A longitudinally bisected skull of a male Giraffe (*Camelopardalis Giraffa*), wanting the horn-cores.

It demonstrates the great extent of the air-cells, especially in the upper wall of the cranium.

Mus. Brookes.

The following bones, to No. 3639 inclusive, are parts of the same Giraffe as No. 3618:—
Hunterian.

3621. The axis, or vertebra dentata.

The posterior epiphysis of the centrum is wanting: the synchondrosal surface is concave. The fore part of the ridge representing the transverse process is perforated by the vertebral artery, and the fore part of the neurapophysis is perforated by the spinal nerve: there is a long and sharp hypapophysial ridge. The length of this vertebra is eleven inches nine lines.

3622. The sixth cervical vertebra.

The epiphyses are wanting at both ends of the centrum, the front one of which is convex and the hind one concave: a pair of hypapophysial ridges lead from the lower and hinder angles of the centrum forwards to the lamelliform inferior processes.

3623. A middle dorsal vertebra.

The posterior epiphysis of the centrum is wanting. The metapophysis projects midway between the diapophysis and the anterior zygagophysis.

3624. A posterior dorsal vertebra.

Both the epiphyses of the centrum are wanting. The metapophyses have nearly the same position as in the preceding vertebra.

3625. A pair of thoracic ribs.

The head and tubercle are divided by a deep and narrow notch.

3626. The left scapula.

In its great length, as compared with its breadth, it approaches the typical form of the bone, as a pleurapophysis. The coracoid is a low but large protuberance. The spine subsides gradually at both ends, without a rudiment of an acromion.

3627. The right humerus.

The proximal epiphysis is still unconfluent.

3628. The right radius and ulna.

The distal epiphyses are connate, but have not become confluent with their respective diaphyses. Part of the slender shaft of the ulna is suppressed, or has blended with the lower third of the radius, the rest of the ulna being free, or suturally united with the radius.

3629. The right cuneiforme of the carpus.

3630. The right unciforme.

3631. The left cannon-bone, or coalesced third and fourth metacarpals.

The distal epiphyses are connate, but have not become confluent with their respective diaphyses. The length of this cannon-bone is twenty-seven inches.

3632. The right os innominatum.

The posterior concavity between the ilium and ischium is scarcely interrupted or divided by the prominence of the conjoined bones above the acetabulum. The Harderian groove of the acetabulum is wide and deep, and breaks through the border of that cup.

3633. The right femur.

Both proximal and distal epiphyses are ununited to the shaft, which is round, straight, and slender in comparison to the vastly expanded condyles. There is no trace in this femur of the arterial canal which perforates the fore part of the upper third of the shaft in the skeleton No. 3617.

3634. The left tibia.

The proximal epiphysis is ununited to the shaft.

3635. The right metatarsus.

The distal epiphyses are connate, but have not become confluent with their respective coalesced shafts, which answer to those of the third and fourth metatarsals in the pentadactyle foot. The length of this cannon-bone is twenty-six inches nine lines, being not quite equal to the metacarpus of the same individual, which illustrates a characteristic of the Giraffe, as being the only known Ruminant in which the metatarsus does not exceed the metacarpus in length.

3636. The left astragalus.

3637. The left calcaneum.

3638. The left scapho-cuboid bone.

3639. The proximal phalanx of one of the toes.

The following are deciduous teeth, which were shed by the Nubian Giraffes in the Gardens of the Zoological Society of London. The animals arrived there when between one and two years of age, in May 1836 :—

Presented by the Zoological Society.

3640. The left first or middle inferior incisor.

This was shed in May 1838.

3641. The left second incisor.

This was shed in May 1838. In both incisors the fang has been absorbed to near the base of the crown.

3642. The left upper first milk-molar (*d* 2).

This was shed in October 1838. The crown has been worn down to the common dentinal base, and the three roots, together with part of the base of the crown, have been removed by absorption.

3643. The left upper second milk-molar (*d* 3).

This was shed in November 1838. The four roots and part of the base of the crown have been removed by absorption : the double crescents of enamel have not been worn down on the grinding surface.

3644. The right upper second milk-molar.

This was shed in December 1838, after having undergone the same changes as in the foregoing specimen.

3645. The left upper third milk-molar (*d* 4).

This was shed in February 1840. The enamel crescents are partially obliterated on the grinding surface of the crown, and much of its base, together with the fangs, have been removed by absorption.

3646. The left lower first milk-molar (*d* 2).

This was shed in October 1838. The crown has been worn down to the common dentinal base, and the three roots, together with part of the base of the crown, have been removed by absorption.

3647. The right lower third milk-molar (*d* 4).

This was shed in January 1840. It consists of three lobes, as in other Ruminants, and the enamel-crescents had not been obliterated in the second and third lobes. The fangs and part of the base of the crown have been absorbed.

Genus *Antilope.*

Subgenus *Gazella.*

(Horns in both sexes, annulated and lyrated; lacrymal pits distinct; inguinal and interdigital follicles large; two teats.)

3648. The skeleton of the Gazelle (*Antilope Dorcas*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 14 caudal. The ulna is continued uninterruptedly from the olecranon to the styloid process. The disproportionate length of the metacarpal segment, as compared with the humerus, and of the metatarsal one, as compared with the femur, is extreme in this light, agile, bounding species of Antelope.

Mus. Brookes.

3649. The skull and horns of the Gazelle (*Antilope Dorcas*).

The permanent true molars are in place, but the deciduous ones are not shed.

Purchased.

3650. The skull and horns of the White-faced Antelope (*Antilope pygarga*).

From Caffraria.

Hunterian.

3651. The horns of the White-faced Antelope (*Antilope pygarga*).

From Caffraria.

Hunterian.

3652. The horns of the White-faced Antelope (*Antilope pygarga*).

From Caffraria.

Hunterian.

3653. Part of the calvarium and horns of the *Antilope Melampus*. *Purchased.*

3654. The skull, with the dried skin of the head, of the Springer, or Spring-bok (*Antilope Euchore*). *Purchased.*

3655. The horns of the Springer (*Antilope Euchore*).

From South Africa.

Hunterian.

3656. The horns of the Springer (*Antilope Euchore*). *Mus. Brit.*

3657. The horns of the Springer (*Antilope Euchore*).

Presented by William Norris, Esq.

3658. A pair of recurved horns of an Antelope (*Antilope Kob* ?).

They are referred in the 'Osteological Catalogue' of 1831 to the Springer (p. 142, No. 978), but they are more like those of the Kob Antelope of Buffon.

3659. The horns of the Saiga, or Scythian Antelope (*Antilope Saiga*). *Mus. Brit.*

3660. The horns of the Chinese Antelope (*Antilope gutturosa*). *Hunterian.*

3661. The horns of the Chinese Antelope (*Antilope gutturosa*). *Hunterian.*

Subgenus *Cervicapra*.

(Horns in the male only, annulated and with a triple spiral curve; lacrymal pits distinct; inguinal and interdigital follicles large; two teats.)

3662. The skull and horn-cores of the male Indian Antelope (*Antilope cervicapra*).

Presented by Colonel Everest.

3663. The cranium and horn-cores of the Indian Antelope (*Antilope cervicapra*).

There is a depression and a large superorbital foramen in each frontal, in front of the base of the horn.

Presented by Colonel Finch.

3664. The skull, with the dried skin and horns, of a large *Antilope cervicapra*.

Presented by Colonel Everest.

3665. The skull, with the dried skin and horns, of a young *Antilope cervicapra*.

Presented by Colonel Everest.

3666. The horns of the *Antilope cervicapra*. *Hunterian.*

3667. The horns of the *Antilope cervicapra.* *Hunterian.*

3668. The horns of the *Antilope cervicapra.* *Hunterian.*

3669. A horn of the *Antilope cervicapra,* in longitudinal section.

It shows the solid structure of the bony support or core of the horn, which has been assigned as a character distinguishing the genus *Antilope* from the genera *Ovis* and *Bos,* in which the frontal sinuses are continued into the horn-cores.

Hunterian.

3670. A horn of the *Antilope cervicapra.* *Mus. Brit.*

3671. A horn of the *Antilope cervicapra.* *Mus. Brit.*

3672. The bones of the right anterior extremity of the *Antilope cervicapra.*

Hunterian.

3673. The bones of the right posterior extremity of the *Antilope cervicapra.*

Hunterian.

Subgenus *Acronotus.*

(Horns in both sexes, annulated, with a double curve, but winding in an opposite direction to that in *Cervicapra,* the points directed backwards; lacrymal pits very small; interdigital follicles large; no inguinal follicles; two teats.)

3674. The skull and horns of the Caama (*Antilope Caama*). *Purchased.*

3675. The horns of the Caama (*Antilope Caama*).

From Caffraria.

Hunterian.

3676. The horns of the Cervine Antelope (*Antilope Bubalis*). *Hunterian.*

3677. The skull, with the dried skin and horns, of the *Antilope lunata.*

Purchased.

3678. Part of the calvarium and horns of the male *Antilope lunata.* *Purchased.*

Subgenus *Cephalophus*.

(Horns in the male only, small, straight, or but slightly curved; lacrymal pits oblong; inguinal follicles distinct; interdigital follicles small; four teats.)

3679. The skull and horns of the male Duykerbok or Diving Antelope (*Antilope mergens*).

The parietal projects in an angular form between the bases of the horns, which spring, as usual, from the frontal. The lacrymal forms part of a large and deep depression, lodging the antorbital sac.

From South Africa.

Purchased.

3680. The skull of the Duykerbok (*Antilope mergens*).

The teeth of the upper and lower jaws have been removed from the left side and separately displayed.

Hunterian.

3681. A horn of the Duykerbok (*Antilope mergens*). *Mus. Brit.*

3682. A horn of the male Klipspringer or Rock-springer (*Antilope Oreotragus*).

Mus. Brit.

3683. The skull of the female Klipspringer (*Antilope Oreotragus*).

It is devoid of horns.

Purchased.

3684. A portion of the skull, with the horns and feet, of the Madoqua or Salt's Antelope (*Antilope Saltiana*).

From Abyssinia.

Presented by Henry Salt, Esq.

3685. The horns of the Bosch-bok (*Antilope sylvatica*).

From Caffraria.

Hunterian.

Subgenus *Oryx*.

(Horns in both sexes, annulated, straight or slightly curved, and longer than the head; no lacrymal pits; no inguinal follicles; interdigital follicles large; four teats.)

3686. The dried skin of the head, with the horns, of the Oryx (*Antilope Oryx*).

From South Africa.

Purchased.

3687. Part of the skin of the head, with the horns, of the Oryx (*Antilope Oryx*).

From South Africa.

Purchased.

3688. The horns of the male Oryx (*Antilope Oryx*).

From South Africa.

Hunterian.

3689. A horn of the male Oryx (*Antilope Oryx*).

From South Africa.

Hunterian.

3690. The horns of a female Oryx (*Antilope Oryx*).

From South Africa.

Hunterian.

3691. The horns of the Abyssinian Oryx (*Antilope Beïsa*, Rüppell).

These horns have a single annulation at the base, from which, for about $3\frac{1}{2}$ inches, they are perfectly smooth; and then again become annulated about two-thirds of their length.

From Abyssinia.

Presented by the late Henry Salt, Esq., 1811.

3692. The skull and horns of the Anoa Antelope (*Antilope depressicornis*).

The species is remarkable for the direction of the horns, which project backwards, slightly diverging, and are depressed below the plane of the frontal bone.

From Pulo Pinang.

Presented by Dr. Henderson.

3693. The skull and horns of a younger individual of the *Antilope depressicornis*.

The milk teeth are not shed; the first and second true molars have been acquired; but the last true molar has not yet risen into place.

From Pulo Pinang.

Presented by Dr. Henderson.

3694. Part of the calvarium, with the horns, of the *Antilope depressicornis*.

From Pulo Pinang.

Presented by Dr. Henderson.

3695. Part of the calvarium and horns of the *Antilope depressicornis*.

From Pulo Pinang.

Presented by Dr. Henderson.

Subgenus *Aigoceros.*

(Horns in both sexes, annulated, with a simple curve, the points directed backwards; no lacrymal pits; no inguinal follicles; large interdigital follicles; four teats.)

3696. The skeleton of the Roan or Equine Antelope (*Antilope equina*).

This is one of the largest species of the genus; and, as the weight of the body is increased, the disproportionate length of the metacarpus and metatarsus is diminished. The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 4 sacral, and 14 caudal. The atlas and dentata send out strong diapophyses: from that of the third cervical a broad pleurapophysial ridge extends forwards and underlaps the diapophysis of the axis: a similar structure is presented by the fourth and fifth cervicals, and in the sixth the pleurapophysis forms a broad subquadrate plate extending downwards and a little outwards. This element is absent in the transverse process of the seventh vertebra, which is imperforate. The dorsal spines begin progressively to shorten from the fifth; that of the thirteenth is vertical, and indicates the centre of motion of the trunk. A metapophysis is developed from the front of the diapophysis of the second to the ninth dorsal vertebræ inclusive, where it begins to be transferred to the anterior zygapophysis from which it extends in the last four dorsals and in all the lumbar vertebræ. There is a short anapophysis in the last two dorsals, but not in any of the lumbar vertebræ. The serial homology of the transverse processes of the lumbar vertebræ with the diapophyses of the dorsals, and not with the metapophyses, is very plainly shown in this skeleton. Nine pairs of ribs directly join the sternum, which consists of eight bones and the xiphoid cartilage.

Purchased.

3697. The calvarium and horns of the Sable Antelope (*Antilope niger*).

From South Africa.

Presented by J. Adamson, D.D.

Subgenus *Lyroceros.*

(Horns annulated and lyrated, the points directed forwards; no lacrymal pits; no inguinal follicles; large interdigital follicles; four teats.)

3698. The skull, with the dried skin of the head and horns, of the Waterbok (*Antilope ellipsiprymna*). *Purchased.*

3699. The horns of the Harnessed Antelope (*Antilope scripta*). *Purchased.*

Subgenus *Strepsiceros.*

(Horns spiral or with a spiral ridge; no lacrymal pits; inguinal follicles distinct; no interdigital pits; four teats.)

3700. The horns of the male Eland or Oreas Antelope (*Antilope Oreas*). *Hunterian.*

3701. The horns of the female Eland (*Antilope Oreas*). *Hunterian.*

3702. Part of the skull, with the dried skin of the head and horns, of a female Eland (*Antilope Oreas*). *Purchased.*

3703. The cranium and horns of the Koodoo or Striped Antelope (*Antilope strepsiceros*).

From South Africa.

Hunterian.

3704. The cranium and horns of the Koodoo (*Antilope strepsiceros*). *Hunterian.*

3705. Part of the skull, with the dried skin of the head and horns, of the Koodoo (*Antilope strepsiceros*). *Purchased.*

3706. The horns of the Koodoo (*Antilope strepsiceros*). *Hunterian.*

3707. The horns of the Koodoo (*Antilope strepsiceros*). *Hunterian.*

3708. The horns of the Koodoo (*Antilope strepsiceros*). *Purchased.*

3709. The horns of the Koodoo (*Antilope strepsiceros*). *Hunterian.*

3710. The horns of the Koodoo (*Antilope strepsiceros*). *Mus. Lev.*

3711. The horns of the Koodoo (*Antilope strepsiceros*). *Hunterian.*

3712. The horns of the Koodoo (*Antilope strepsiceros*).

Presented by Sir William Blizard.

Subgenus *Dicranoceros*.

(Horns in the male only, bifurcated; no lacrymal pits; no inguinal follicles; interdigital follicles distinct; four teats.)

3713. The skull and horns of a Prong-horned Antelope (*Antilope furcifer*).

From the Rocky Mountains of North America.

Presented by Joseph Sabine, Esq.

3714. The horns of a Prong-horned Antelope (*Antilope palmata*, SMITH).

These horns have a small additional process near the angle of bifurcation of the beam: they are figured by Colonel Hamilton Smith, in the 'Linnean Transactions,' vol. xiii. pl. 3.

From the Rocky Mountains near the River Jaune.

Hunterian.

Subgenus *Tetraceros*.

(Horns in two pairs, short and straight.)

3715. The skeleton of the Chickara or Four-horned Antelope (*Antilope Chikara*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, 12 caudal. The pleurapophysial parts of the transverse process of the third to the sixth cervical vertebræ inclusive forms a broad, hatchet-shaped plate, the antero-posterior extent being greatest in that of the third. The Antelopine characters are well shown in the long and slender metacarpal and metatarsal segments of the limbs. The animal from which the skeleton was obtained was brought alive to this country from Bengal. For an account of its admeasurements and external characters, see the "Remarks on the *Antilope Chikara*," in two letters addressed to the Secretary of the Linnean Society by Robert Hills, Esq., F.L.S., vol. xv. of the 'Linnean Transactions,' p. 501.

Presented by Sir Anthony Carlisle, F.R.S.

3716. The skull and horns of a younger Chickara (*Antilope Chikara*).

The deciduous teeth are retained, and the anterior horns are not developed.

Presented by Col. Everest.

3717. The skull and horn-cores of the male Chickara (*Antilope Chikara*).

Presented by Col. Everest.

3718. The skull of a Chickara (*Antilope Chikara*).

The posterior horn-sheaths are wanting: the anterior ones differ from those of the skeleton No. 3715, in being much more acuminate, and obliquely compressed on their inner side; which, in a transverse section, would give them something of a lozenge form.

From Moorshedabad.

From this specimen, M. Blainville formed his species called *Antilope quadricornis*.

Purchased.

3719. The calvarium and horns of a young Chickara (*Antilope Chikara*).

The anterior horns are short and stumpy.
From Moradabad.

Presented by Col. Everest.

3720. One of the posterior horns of a Chickara (*Antilope Chikara*). *Mus. Brit.*

Subgenus *Raphiceros.*

(Horns two, in the males only; short, straight and acute.)

3721. The frontlet and horns of the Sharp-horned Antelope (*Antilope acuticornis*, De Blainville). *Mus. Brit.*

3722. A horn of the Sharp-horned Antelope (*Antilope acuticornis*). *Mus. Brit.*

3723. The frontlet and horns of the Awl-horned Antelope (*Antilope subulata*, De Blainville).

The species founded on this specimen is of doubtful authenticity: the horns may probably be those of the young of the *Antilope* (*Calotragus*) *Tragulus*.

Mus. Brit.

Subgenus *Portax.*

(Horns in the male only; lacrymal pits large; no inguinal follicles; interdigital follicles distinct; four teats.)

3724. The horns of the Nylghau (*Antilope picta*). *Hunterian.*

Subgenus *Rupicapra.*

(Horns in both sexes, their point abruptly recurved; post-auricular follicles.)

3725. The horns of the Chamois (*Antilope rupicapra*).

From Switzerland.

Hunterian.

3726. The horns of the Chamois (*Antilope rupicapra*). *Mus. Brit.*

3727. A horn of a Chamois (*Antilope rupicapra*). *Mus. Brit.*

3728. A polished horn of a Chamois (*Antilope rupicapra*). *Mus. Brit.*

3729. A horn of the Caucasian Chamois (*Antilope rupicapra*).

From Northern Tartary.

Mus. Brit.

Subgenus *Næmorrhedus*.

(Horns in both sexes; large lacrymal pits; no inguinal pits; distinct interdigital pits; four teats.)

3730. The mutilated skull and horns of the Cambing Utan, or Sumatran Antelope (*Antilope sumatrensis*).

The permanent true molars are in place, but the deciduous molars are not shed.

Hunterian.

3731. The skull and horns of the Sumatran Antelope (*Antilope sumatrensis*).

Hunterian.

3732. The skull and horns of the Sumatran Antelope (*Antilope sumatrensis*).

Hunterian.

3733. The skull of a female Sumatran Antelope (*Antilope sumatrensis*). *Hunterian.*

Subgenus *Kemas*.

(Horns in both sexes; no lacrymal pits; no inguinal follicles; large interdigital follicles; four teats.)

3734. The skull and horns of the Goral Antelope (*Antilope Goral*).

Presented by Colonel Finch.

3735. The skull and horn-cores of the male Goral Antelope (*Antilope Goral*).

Presented by Colonel Everest.

Genus *Capra*.

3736. The skeleton of a common Goat (*Capra Hircus*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral: there are 9 caudal vertebræ, but the series is incomplete. Eight pairs of ribs directly join the sternum, which consists of seven bones and a partially ossified ensiform cartilage. The ulna is confluent with the radius. The humerus is longer than the metacarpus, and the femur than the metatarsus: the medullary artery enters the fore part of the upper third of the femur.

Mus. South.

3737. The skull and horn-cores of a common Goat (*Capra Hircus*).

The following differences may be noticed in comparing the skull of this species of Goat with that of the Sheep (*Ovis Aries*). In the Sheep the postorbital process or plate is broader and more bent outwards, forming a deeper depression between it and the origin of the horn; it also turns the plane of the orbit more obliquely forwards: in the Goat the aspect of this plane is more directly outwards. With regard to the horn-cores, they are subcompressed, and flattened at the postero-internal side in both, the transverse section approaching a semi-ellipse in shape, which is fuller in the Sheep; the long axis of this semi-ellipse passes obliquely from before outwards and backwards, but more outwards in the Sheep than in the Goat. In both, the horn-core is slightly twisted as it ascends, so that the flat side is made to look more directly backwards, but with a greater degree of curvature in the Sheep than in the Goat. The horn-core is relatively longer in the Sheep, so that, after extending outwards, it bends down and then forwards; yet it differs from that of the Goat only in the extent and degree, not in the direction, of the curvature: were the stronger and longer curve of the Sheep's horn-core to be unbent, it would be brought to the curve characteristic of the Goat before it was made straight. The occiput is higher in proportion to its breadth in the Goat than in the Sheep. The petrosal is relatively longer and deeper in the Goat than in the Sheep; in both the stylohyal articulates with the petrosal. The nasals are relatively smaller in the Goat, where they are shorter than the premaxillaries; their upper surface is concave lengthwise, except at the free points, where they are slightly bent down. In the Sheep the nasals are relatively larger, are longer than the premaxillaries, and their whole upper surface is convex lengthwise. There are also differences in the connections of these bones; in the Sheep the nasals join the lacrymals and not the premaxillaries, whilst in the Goat they join the premaxillaries but not the lacrymals,—a vacuity, which is not present or is rudimental in the Sheep, separating them from the lacrymals. In the Aoudad (No. 3780) the nasals present, both in their form and connections, the characteristics of the Sheep. The upper border of the maxillary bone is relatively shorter in the Goat, and the anterior border is not notched to receive the upper end of the premaxillary, as it is in the Sheep. The premaxillary is narrower at its alveolar end in the Goat, and its upper end rises so as to overlap the side of the nasal: in the Sheep the premaxillary is relatively broader, and does not rise to touch the nasal. The lacrymal bone of the Goat is shorter in proportion to its breadth, and is not impressed on its facial surface by a lacrymal fossa; it does not touch the nasal: in the Sheep the lacrymal is longer in proportion to its breadth, and is more regularly quadrate in form; it joins the nasal, and thus obliterates that vacuity which is present in the skull of the Goat; its facial plate is impressed by a concavity for the cutaneous lacrymal pit. The lacrymal bone of the Aoudad resembles that of the *Ovis Aries* in both form and connections, but its facial plate has no concavity for a cutaneous lacrymal pit. In comparing the upper contour of the skull, from the transverse occipital ridge behind to the free extremity of the nasal bones, we find it forming, in the Goat, nearly a right angle, with the two sides equal: in the Sheep it forms a more open angle, with the anterior side twice as long as the posterior one. The *Ovis tragelaphus* agrees with *Ovis Aries* in this character.

Hunterian.

3738. The skull of a young Goat (*Capra Hircus*).

The deciduous molars and the first and second true molars are in place: the three premolars (*p* 2, *p* 3 & *p* 4) are exposed in their formative sockets on the right side of both upper and lower jaws, and also the last trilobed molar of the lower jaw.

Purchased.

3739. The horns, somewhat malformed, of a common Goat (*Capra Hircus*).

Hunterian.

3740. The horns of the Angora variety of the Goat (*Capra Hircus*). *Purchased.*

3741. The horns of the Iceland, or four-horned, variety of the Goat (*Capra Hircus*).

Mus. Brookes.

3742. The skull, with the dried skin and horns, of the Ibex (*Capra Ibex*).

The horns are very long and large, with a gentle curve upwards, outwards and backwards, in nearly the same plane: their fore part is square or flattened, with prominent transverse ridges.

Hunterian.

3743. The horns of the Caucasian Ibex (*Capra Caucasica*).

The horns are obtuse, not squared, in front, but are similarly ridged transversely.

Mus. Brit.

3744. The frontlet and horns of the male *Capra Ægagrus.*

The long diameter of the base of the horn is placed obliquely to the axis of the skull, the bases of the pair converging anteriorly. The annual rings of growth are well shown in these horns, owing to the beak-like process, which bends down from the fore part of each ring, forming the undulating anterior ridge of the horn. This process is seen in the four lower rings; that of the fifth is shorter, and it is not distinguishable in the apical segment. These segments, successively and annually pushed upward from the base of the horn, answer to the antlers which are successively developed and shed in the Deer-tribe.

Purchased.

3745. The frontlet and horns of a smaller individual of the *Capra Ægagrus.*

Each horn has eight rings, the last-formed one being much shorter than the rest.

Purchased.

3746. The horns of the variety of the Wild Goat called *Capra Ægagrus* by Pallas.

Each horn has six irregular nodules on the anterior surface, more widely apart from each other than in the *Capra Ægagrus* of Cuvier, of which, if the animal be not specifically distinct, it must be a well-marked variety.

Mus. Brit.

3747. The calvarium and horns of the Bardah (*Capra Bardah*).

Being a female, the horns are relatively small, not exceeding six inches; they are slightly lyrated. The long diameter of the base of the horn is transverse to the axis of the skull. The frontal bone anterior to the horns is flat.

Presented by Colonel Finch.

3748. The skeleton of the Nepaul Goat (*Capra Nepalensis*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 13 caudal, but the terminal one is wanting. The lumbar diapophyses are unusually expanded at their extremity. The ulna has coalesced with the radius. The femur is perforated at the fore part of its proximal third by the canal for the medullary artery.

Mus. Brookes.

3749. The horns of the Jemlah Goat (*Capra Jemlahica*).

Presented by Colonel Finch.

3750. The mutilated skull and horn-cores of the Sumatran Goat (*Capra Sumatrensis*).

The horns are twisted and traversed by a ridge which springs from the outer side of their base. The coronal suture is beautifully dentated; the sagittal one is obliterated; the frontal suture is persistent.

Transmitted from Sumatra by Mr. William Bell.

Hunterian.

Genus *Ovis.*

3751. The skeleton of a Ram, or male of the Domestic Sheep (*Ovis Aries*).

The vertebral formula is:—7 cervical, 13 dorsal, 7 lumbar, 4 sacral: of the caudal vertebræ 7 remain. The pleurapophysial parts of the transverse processes of the third, fourth and fifth cervicals underlap the diapophysial parts of those in advance: the pleurapophysis of the sixth cervical is an oblong quadrate plate: the diapophysis only is present in the transverse process of the seventh, which is imperforate. The neural spines increase in height from the third to the seventh cervical, and are suddenly and greatly surpassed in height by those of the anterior dorsals. The metapophysis is developed on the second and succeeding dorsals; attains the anterior zygapophysis in the eleventh; and projects from that part in all the lumbar vertebræ. Seven pairs of ribs directly join the sternum, which consists of six bones. The costal portions of the transverse processes of the first lumbar vertebra remain distinct. The ulna has become anchylosed to the radius, but its limits may be defined throughout. The medullary artery enters the fore part of the upper third of the femur.

Presented by Lord Clarendon.

3752. The skull and horns of a Ram (*Ovis Aries*).

The nasal and premaxillary bones are wanting.

Hunterian.

3753. A longitudinal section of the skull and right horn of a Ram (*Ovis Aries*).

It shows the extent to which the frontal sinuses are continued into the base of the horn-core. The convexity of the long nasals, the non-union therewith of the premaxillaries, the depression for the lacrymal tegumentary fossa common to the facial part of the lacrymal and contiguous part of the malar, and the degree of curvature of the horn, noticed as characteristic of the Sheep in the comparison with the Goat, No. 3737, are well seen in this specimen.

Presented by Henry Cline, Esq.

3754. The corneous sheath of the horn of a Ram, in longitudinal section, to show the extent of its cavity. *Hunterian.*

3755. The skull and horns of a Ram of the Merino variety of the *Ovis Aries.*

Hunterian.

3756. The skull and horns of a Ram of the Merino variety of the *Ovis Aries.*

Hunterian.

3757. The skull and horns of a Ram of the Merino variety of the *Ovis Aries.*

Hunterian.

3758. Part of the cranium, with the horns, of a Ram of the Merino variety of the *Ovis Aries.* *Hunterian.*

3759. The skull of a Ram of the Norfolk breed or variety of the *Ovis Aries.*

Purchased.

3760. The skull of a Ewe of the Norfolk variety of the *Ovis Aries.*

The sexual distinction is chiefly manifested by the small size of the horns.

Purchased.

3761. The skull of a Wether or castrated Ram of the Norfolk variety of the *Ovis Aries.*

The development of the horns has been not only arrested at the degree which it presents in the female, but the growth has, also, been abnormal in its direction, the curve being such that the points would have entered the orbits had they not been sawed off during the lifetime of the animal.

Purchased.

3762. The skull of a Ram of the hornless variety of the *Ovis Aries.* *Hunterian.*

3763. The skull of a Sheep of the hornless variety of the *Ovis Aries.*

Presented by Henry Cline, Esq.

3764. The cranium and horns of the many-horned variety of the *Ovis Aries.*

The present example shows four horns.

Hunterian.

3765. The skull and horns of the many-horned variety of the *Ovis Aries.*

The present example shows five horns.

Hunterian.

3766. A portion of the right superior maxillary bone, containing three molars, of a Sheep (*Ovis Aries*).

The enamelled surfaces are coated by a substance having a metallic lustre. Originally labelled, "*Presented by Dr. Needham, Oct. 20th,* 1673."

Mus. Brit.

3767. Three premolars of a Sheep (*Ovis Aries*), with the enamelled part of the crown presenting a similar appearance. *Mus. Brit.*

3768. Two lower molars of a Sheep (*Ovis Aries*).

One of these is longitudinally divided: a transverse section has been removed from the crown of the other; the cut surfaces in both are polished.

Hunterian.

3769. Two of the thoracic ribs, connate, of a Sheep (*Ovis Aries*). *Mus. Brit.*

3770. Two of the thoracic ribs, connate, of a Sheep (*Ovis Aries*).

In this specimen one of the ribs is bifid at its sternal extremity.

Mus. Brit.

3771. The frontlet and malformed horns of an Asiatic Ram (*Ovis Ammon* ?).

In this specimen the horns have grown parallel to each other, and are firmly united throughout their whole extent, producing the appearance of a single horn, the extremity of which has been sawed off, probably to relieve the animal from the inconvenience of its pressure upon the neck.

From the Himalayan Mountains.

Presented by Colonel Finch.

3772. A somewhat mutilated cranium and horns of the gigantic Argali (*Ovis Ammon*).

The circumference of the base of each horn is sixteen inches nine lines; the length of the horn, following the greater curvature, is three feet five inches and a half. The premaxillary bones and paroccipital processes have been removed: the facial part of the lacrymal has a depression for the lacrymal pit.

From the mountains of Affghanistan.

Presented by William Darby, Esq., F.R.C.S.

3773. The corneous sheath of one of the horns of the gigantic Argali (*Ovis Ammon*).

The circumference of the base is fourteen inches nine lines; the length of the horn, following the greater curvature, four feet.

Purchased.

3774. The skull, with the dried skin of the head and horns, of the North American Argali, or Rocky-Mountain Sheep (*Ovis montana*). *Hunterian.*

3775. The horns of the *Ovis montana*. *Presented by the Hudson's Bay Company.*

3776. The frontlet and horns of the Burrhal Sheep (*Ovis Burrhal*).

The horns are broader at the base in proportion to their length and much less curved than in the Argali or common Ram, and their bases come almost into contact upon the upper surface of the skull. The curve is upwards, outwards, then downwards and a little backwards, the points scarcely reaching the level of the base.

Purchased.

3777. The horns of the *Ovis Burrhal*.

The sheath is removed from the right horn to show the proportion and form of the core; and both core and sheath are longitudinally bisected on the left horn.

Purchased.

3778. The skull and horns of the Ladak Argali (*Ovis Vignei*).

The bases of the horns meet upon the summit of the skull, whence they diverge with a wide curve upwards, outwards, backwards and downwards in almost the same plane. The premaxillaries join the nasals, and the facial part of the lacrymal is deeply impressed by the lacrymal pit.

From Thibet.

Presented by Captain Strachey, R.E.

3779. The skeleton of the Nahura Argali (*Ovis Nahura*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 10 caudal. The ast rib is articulated by the head only. The metapophyses commence on the sixth dorsal, and gain the outside of the zygapophyses in the twelfth, retaining the same position, with the form of tuberosities throughout the lumbar series. The lacrymal joins the nasal, but is not impressed by a lacrymal pit. The premaxillary joins the nasal. The base of the horn-core is subquadrate, with the angles rounded: the horn is directed upwards and outwards, with a slightly spiral twist backwards: the corneous sheath is traversed, above, by a longitudinal ridge, which is not indicated by the bone-core: it is feebly annulated. The cranial characters of the Nahura are intermediate between those of the *Capra Hircus* and *Ovis Aries*. The medullary artery enters the fore and upper part of the femur.

From Thibet.

Presented by Captain Strachey, R.E.

The following, to No. 3807 inclusive, are parts of the same skeleton of the Aoudad or African Argali (*Ovis tragelaphus*).

Purchased.

3780. The cranium, vertically and longitudinally bisected.

The right horn had been broken off during the animal's life-time, and the base of the horn-core, which was covered by a callous dermal cicatrix, is widely open, showing the communication of its cavity with the frontal sinuses. The left moiety shows the complete septum which divides the extensive frontal sinuses of one side from those of the other. The base of the horn is trihedral, with the longitudinal diameter transverse to the axis of the skull: the frontal is flat, and ascends from the nasal straight to the base of the horns, which curve obliquely backwards, outwards and downwards, with the apex slightly twisted inwards. The number of the annulations of the horn indicate them to be developed at shorter periods than years. The long nasal bones are continued forwards in almost the same straight line with the frontals. The facial plate of the lacrymal is very long: it articulates with the nasal, leaving a small interval between it, the base of the nasal and the frontal: its external surface is slightly depressed. The premaxillary does not reach the nasal. The numbers on the individual bones in the left moiety indicate their names according to the TABLE OF SYNONYMS.

3781. The two rami of the lower jaw.

The permanent dentition is shown in both upper and lower jaws.

3782. The atlas.

3783. The axis.

3784. The five other cervical vertebræ.

3785. The twelve dorsal vertebræ.

3786. The seven lumbar vertebræ.

The diapophyses of the first are very short.

3787. The four sacral vertebræ.

3788. The first caudal vertebra.

3789. The first thoracic rib of the left side.

3790. A middle thoracic rib of the left side.

3791. The sternum, which consists of seven bones.

3792. The right scapula.

3793. The right humerus.

3794. The right radius.

3795. The right ulna.

3796. The right metacarpus.

3797. The left humerus, in longitudinal section.

3798. The left radius, in longitudinal section.

3799. The left metacarpus, in longitudinal section.

3800. The right os innominatum.

3801. The right femur.

3802 The right tibia.

3803. The left femur, in longitudinal section.

3804. The left tibia, in longitudinal section.

3805. The right tarsus, articulated.

It includes the astragalus, calcaneum, scaphocuboid and ectocuneiform.

3806. The right metatarsus.

3807. The left metatarsus, in longitudinal section.

Genus *Catoblepas.*

3808. The skeleton of the Gnu (*Catoblepas Gnu*).

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 4 sacral, and 15 caudal. The sternum consists of seven bones. The spine of the sixth cervical is unusually bent forwards; that of the third is vertical, indicating the centre of motion of the neck. The freedom and extent of motion of this part required for the act of grazing, as well as of wielding the horns, is facilitated by the ball-and-socket joints of the bodies of the cervical vertebræ. There are no anapophyses: the other vertebral characters correspond with those of the Equine Antelope, No. 3696. The medullary artery of the femur perforates the fore part of the upper third of the shaft, the canal inclining backwards and downwards. The ulna is continued as a distinct bone from the radius to the styloid process. The humerus is as long as the metacarpus, and the femur is as long as the metatarsus.

Purchased.

3809. The skull, with the dried skin of the head and horns, of the Gnu (*Catoblepas Gnu*). *Hunterian.*

3810. The skull of a Gnu (*Catoblepas Gnu*).

This species is remarkable for the large base of the horns, which considerably overhang the occipital region, and have pushed the small parietal quite to the back part of the skull. The frontal suture is obliterated, except at its anterior part. There is no depression for the lacrymal pit on the facial plate of the lacrymal bone.

Purchased.

3811. The cranium and horns of a young female of the Brindled Gnu (*Catoblepas Gorgon*).

The horns are comparatively small. The frontal suture is persistent and extends to the points of the parietals, which bend forwards in advance of the occipital region.

Purchased.

3812. The cranium of a young female Brindled Gnu (*Catoblepas Gorgon*).

The alisphenoid sends forwards a strong and long process into the orbital cavity.

Purchased

Genus *Ovibos.*

3813. The skull and horns of a male Musk Ox (*Ovibos moschatus*)*. *Hunterian.*

* For an excellent description of the skeleton of this Ruminant the reader is referred to Sir John Richardson, M.D., 'Fossil Mammals of the Zoology of the Voyage of H.M.S. Herald,' 4to, pp. 66—87.

3814. The skull and horns of a male Musk Ox (*Ovibos moschatus*). *Hunterian.*

3815. The skull and horns of a male Musk Ox (*Ovibos moschatus*). *Hunterian.*

3816. A mutilated skull and horns of a male Musk Ox (*Ovibos moschatus*).

From the Polar regions of North America.

Presented by Captain Sir Edward Parry, R.N.

3817. The mutilated skull and horns of a female Musk Ox (*Ovibos moschatus*).

Presented by Captain Sir Edward Parry, R.N.

Genus *Bison.*

3818. The skull of the male Aurochs (*Bison europæus*).

In this genus the horns arise in advance of the superoccipital ridge which is formed by the superoccipital bone, the parietals advancing to the upper surface of the skull and being interposed between the frontal and superoccipital. The Bison differs from the Buffalo (*Bubalus*, No. 3849) in the greater breadth and convexity of the frontal, and in the much greater extent of the orbital processes of that bone, which, with the coextensive processes of the lacrymal and malar, form a prominent cylinder of bone. The nasals are relatively shorter and broader than in the Ox (*Bos*, No. 3828); but the chief distinction between the Bison and the Ox is seen in its shorter premaxillaries, which do not rise to join the nasals: here, therefore, six bones enter into the formation of the external nasal aperture, instead of four as in *Bos* and *Bubalus*. The horns in the present species of *Bison* have a subcircular transverse section, and curve outwards, upwards, and a little backwards.

From Lithuania.

Presented by Prof. Otto, of Breslau.

3819. The bones of the trunk of a young male Aurochs (*Bison europæus*).

The vertebral formula is :—7 cervical, 14 dorsal, 5 lumbar, 4 sacral, and 17 caudal. Eight ribs directly join the sternum, which consists of seven bones and a xiphoid cartilage. The dentata has a broader and shorter spine than in the Common Ox; that of the third cervical is vertical, indicating the centre of the movements of the neck. The spine of the seventh cervical is longer and more slender than in the Ox, and this difference is still more marked in the spines of the anterior dorsal vertebræ. The spinal nerves directly perforate the neurapophyses of the third to the thirteenth dorsal vertebræ inclusive. From the fourth to the sixth inclusive the outlet is crossed by a bony bar, extending from the diapophysis to the posterior surface for articulating with the head of the rib. The ribs are more slender than in the Common Ox. The metapophysis is most distinct on the ninth, tenth and eleventh dorsals; in the thirteenth and fourteenth it has ascended to the zygapophysis. The change of form of

the diapophysis of the first lumbar, as compared with that of the last dorsal, is as extreme as that in the Common Ox; but the succeeding lumbar diapophyses are less broad. The outer angle of the ilium is more pointed, and the posterior notch of the ilium is much shorter and deeper than in the Common Ox.

Presented by the Zoological Society of London.

3820. The horns of a young female Aurochs (*Bison europæus*). *Hunterian.*

3821. The skull of the male Gaur, or Indian Bison (*Bison Gaur*).

The characters of the genus are shown by the short premaxillaries and the proportion of the maxillaries which enter into the formation of the external nostril; but the frontal bones at the interspace between the horns are, with the conjoined parietals, developed into a thick, rough and prominent convex ridge, which differs from that in *Bos* chiefly by its greater elevation above the ridge formed by the superoccipital. The orbits are less prominent than in the *Bison europæus*. The horns have a similar size, direction, and extent of curvature.

Purchased.

3822. A horn of an American Bison (*Bison americanus*). *Hunterian.*

3823. A horn of an American Bison (*Bison americanus*). *Hunterian.*

3824. A horn of an American Bison (*Bison americanus*). *Hunterian.*

Genus *Bos*.

3825. The skeleton of the Long-horned or Lancashire variety of the Common Ox (*Bos Taurus*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 5 sacral, and 21 caudal. The neural spine is longest in the third dorsal, whence the spines gradually shorten to the tenth: the metapophysis passes from the diapophysis to the zygapophysis in the tenth, eleventh and twelfth dorsals. In the first lumbar the diapophysis exchanges its short, thickened, obtuse shape for a long, broad, vertically compressed plate: these processes increase in length to the fourth lumbar. The foramina for the spinal nerves directly perforate the neurapophyses of the dorsal vertebræ: they escape by conjugational foramina at the interspaces of the lumbar vertebræ. The humerus exceeds the metacarpus, and the femur the metatarsus, in length. The ulna, though anchylosed to the radius, is uninterrupted from the olecranon to the styloid process.

Hunterian.

3826. The cranium and horns of the Long-horned variety of the Common Ox (*Bos Taurus*). *Hunterian.*

3827. The cranium and horns of the Long-horned variety of the Common Ox (*Bos Taurus*). *Hunterian.*

3828. The skull of a male or bull of the Short-horned or Guernsey variety of the *Bos Taurus*. *Presented by the Very Rev. Dr. Buckland, F.R.S.*

3829. The skull of the hornless variety of the Common Ox (*Bos Taurus*, var.).

A rugged, slight protuberance at the posterior and outer angle of each of the elongated frontal bones is the sole indication of the characteristic processes or horn-cores in this variety. It may be remarked that, although the full size and mature dentition have been acquired, the suture between the exoccipitals, and that between these and the superoccipital, remain distinct. The whole of the upper surface of the cranium is formed by the frontals: the parietals, which, at an earlier period, encroach upon the back part of the upper surface, are now pushed quite to the posterior or occipital aspect.

Presented by Henry Cline, Esq.

3830. The cranium of the hornless variety of the Common Ox (*Bos Taurus*).

Not any rudimentary tubercle has been developed at the outer angle of the frontal bone. The left alveolar process of the upper jaw has been diseased. The parts of the occipital bone have coalesced.

Purchased.

3831. The skull of a young heifer of the hornless variety of *Bos Taurus*.

It has only acquired the first true molar of the permanent series of teeth in both jaws. The second true molar was cutting the gum: none of the deciduous molars are shed. The summits of the lobes of the last true molar are exposed on the right side of the upper jaw; two of the lobes of the right lower molar are similarly exposed. The rest of the matrix of these teeth has remained uncalcified. Calcification of the matrices of the premolars had not commenced. The length of the skull in a straight line is fourteen inches.

Purchased.

3832. The skull of a variety of the Common Ox (*Bos Taurus*), which is propagated in the Pampas of South America.

It is remarkable for the stunted development of the nasals, premaxillaries, and fore part of the lower jaw, which is unusually curved upwards to come into contact with the premaxillaries. The nasal bones are about one-third the ordinary length, but retain almost their normal breadth. The triangular vacuity is left between them, the frontal, and the lacrymal, which latter bone articulates with the premaxillary, and thus excludes the maxillary from any junction with the nasal. The horns are developed from the frontal, where it forms the outer angles of the superoccipital ridge. The mature dentition has been acquired in this specimen.

Presented by Charles Darwin, Esq., F.R.S.

3833. The horns of a Transylvanian breed or variety of the Common Ox (*Bos Taurus*). *Hunterian.*

3834. The horns of an Italian breed or variety of the Common Ox (*Bos Taurus*). *Hunterian.*

3835. The horns of the Galla or Sanga, an Abyssinian variety of the Common Ox (*Bos Taurus*).

The following extract connected with these extraordinary horns is from Mr. Salt's 'Travels in Abyssinia,' p. 258 :—" Here (Gibba), for the first time, I was gratified by the sight of the Galla Oxen, or Sanga, celebrated throughout Abyssinia for the remarkable size of their horns. Three of these animals were grazing among the other cattle, in perfect health ; which circumstance, together with the testimony of the natives, 'that the size of the horns is in no instance occasioned by disease,' completely refutes the fanciful theory given by Mr. Bruce respecting this creature. It appears by the papers annexed to the last edition of Mr. Bruce's work, that he never met with the Sanga, but that he made many attempts to procure specimens of the horns through Yanni, a Greek, residing at Adowa. This old man very correctly speaks of them, in his letters, as being brought only by the Cafilas from Antálo ; and I have now ascertained that they are sent to this country as valuable presents by the chiefs of the Galla, whose tribes are spread to the southward of Enderta. So far then, as to the description of the horns and the purposes to which they are applied by the Abyssinians, Mr. Bruce's statements may be considered to be correct ; but with respect to 'the disease which occasions their size, probably derived from their pasture and climate ;' 'the care taken of them to encourage the progress of this disease ;' 'the emaciation of the animal ;' and the 'extending of the disorder to the spine of the neck, which at last becomes callous, so that it is not any longer in the power of the animal to lift its head ;' they all prove to be merely ingenious conjectures, thrown out by the author solely for the exercise of his own ingenuity. I should not venture to speak so positively on this matter, had I not indisputably ascertained the facts ; for the Ras having subsequently made me a present of three of these animals alive, I found them not only in excellent health, but so exceedingly wild, that I was obliged to have them shot.

" The horns of one of these are now deposited in the Museum of the College of Surgeons, and a still larger pair are placed in the collection of Lord Valentia (now Earl Mountnorris) at Arley Hall. The length of the largest horn of this description which I met with was nearly four feet, and its circumference at the base twenty-one inches. It might have been expected, that the animal carrying horns of so extraordinary a magnitude would have proved larger than others belonging to the same genus ; but in every instance which came under my observation, this was by no means the case."

Presented by the late Henry Salt, Esq.

3836. A pair of large horns of a variety of the Common Ox (*Bos Taurus*).

They were brought from America about the year 1770, by Admiral Warren. Their length from tip to tip, following their greatest curve, is ten feet four inches.

Presented by the late William Long, Esq.

3837. The pelvis of a Cow or female of the *Bos Taurus.*

This part is formed by four sacral vertebræ and the ossa innominata. The obturator foramina are shorter and wider ovals than in the Bison.

Purchased.

3838. The skull of a new-born Calf or young of the *Bos Taurus.*

The teeth in place are the lower deciduous incisors and canines, and the second and third deciduous molars in both jaws: the first is just appearing through the gum. The four elements of the occipital are distinct from one another, the paroccipitals being exogenous processes of the occipital, but the superoccipital has coalesced with the parietal along the greater part of the lambdoidal suture. A thin strip of the parietal extends downwards and forwards between the frontal and squamosal to join the alisphenoid: the tympanic and petrosal have coalesced; but the mastoid and squamosal are distinct bones. The pterygoids are distinct from the ectopterygoid processes of the alisphenoids. There are no rudiments of horns.

Purchased.

3839. The disarticulated bones of the head of a Calf (*Bos Taurus*).

The exoccipitals meet above and complete the foramen magnum: a small part of each condyle is formed by the basioccipital. The superoccipital and the extremely short parietals have already coalesced. The lower angles of the parietal extend forwards to join the alisphenoids: these have coalesced with the basisphenoid. The foramen ovale is near the middle of their base; they send down long compressed pterygoid processes: the true pterygoids are distinct, thin, lamelliform bones. The orbitosphenoids have coalesced with each other, with the neurapophyses of the nasal vertebra (nasal plate of æthmoid), and with the æthmoid cribriform plates, cells, and upper turbinals. The coalesced bases of the orbitosphenoids simulate a vertebral centrum and present a symphysial surface to the basisphenoid behind, but are overlapped by the presphenoidal part of the vomer below. The optic foramina commence by a common transverse elliptical opening. The frontal bones attain their greatest relative size in the *Bovidæ,* extending backwards to the occipital region, where they rest on the broad sutural surface formed by the compressed parietals upon the crista occipitalis. The horn-cores are sent off from the outer angles of this part of the frontal, which is supported by the thick vertical wall of the superoccipital; the shock of a blow dealt by the horns being received, not by the supracerebral roof, but by this strong posterior wall of the cranium, and transferred by it directly to the condyloid cavities of the atlas and the vertebral column. The petromastoid, tympanic and zygomatic parts of the temporal have already coalesced: the tympanic is grooved behind for the ligamentous joint of the stylo-hyal. The base of the zygoma is perforated

both above and below; the two holes leading to a common venous sinus, which opens upon the inner surface between the squamous and petrous portions. The mastoid forms a short angular ridge applied to the base of the long paroccipital process. Only a very narrow strip of the squamous part of the temporal enters into the formation of the walls of the cranial cavity between the parietal, alisphenoid and petrosal. The lacrymals are noticeable for the large size of their facial and orbital portions.

Mus. South.

3840. Longitudinal sections of a molar tooth of the upper jaw of a Cow (*Bos Taurus*), to show its structure. One section is polished.

Presented by Sir Everard Home, Bart.

3841. A transverse section of a molar tooth of the upper jaw of a Cow (*Bos Taurus*). *Hunterian.*

3842. The skeleton of the Zebu, an Indian humped variety of the Ox (*Bos Taurus*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 4 sacral, and 15 caudal.

Purchased.

3843. A pair of small horns of an Indian variety of Ox (*Bos Taurus*). *Hunterian.*

3844. The frontlet and horns of the Gyall, a wild species of Indian Ox (*Bos frontalis*). *Hunterian.*

Genus *Bubalus*.

3845. The skull, with the dried skin and horns, of the Cape Buffalo (*Bubalus Caffer*). *Hunterian.*

3846. The frontlet and horns of the Cape Buffalo (*Bubalus Caffer*). *Hunterian.*

3847. The frontlet and horns of the Cape Buffalo (*Bubalus Caffer*). *Hunterian.*

3848. The frontlet and horns of the Arnee Buffalo (*Bubalus Arnee*).

From India.

Presented by Dr. Buchan.

3849. The skull of an Indian Buffalo (*Bubalus indicus*).

The horns spring out above and anterior to the superoccipital ridge, which is formed exclusively by the superoccipital element. The apex of the parietal extends upon the back part of

the upper surface of the skull: the frontal bones are shorter and the nasals considerably longer in proportion than in the Common Ox. The orbits are nearer the base of the horns. These bases are flattened above, and have a semioval transverse section with a single curve outwards, backwards, and a little upwards, being depressed in their course below the level of the frontal bone.

Presented by Gideon Mantell, D.C.L., F.R.S.

3850. The right ramus of the lower jaw of the young of a large Ruminant; showing the three deciduous molars and the first true molar of the right side *in situ*.

Hunterian.

3851. The left cannon-bone, or confluent metacarpus, of the Yak (*Bubalus grunniens*).

Presented by Captain Strachey, R.E.

3852. The left cannon-bone, or confluent metacarpus, longitudinally bisected, of the Yak (*Bubalus grunniens*).

The original septum of the medullary cavity is partially absorbed: its thick walls are very compact.

Presented by Captain Strachey, R.E.

3853. The left os magnum of the Yak (*Bubalus grunniens*).

Presented by Captain Strachey, R.E.

3854. The right scaphocuboid of the Yak (*Bubalus grunniens*).

Presented by Captain Strachey, R.E.

3855. The right ectocuneiform of the Yak (*Bubalus grunniens*).

Presented by Captain Strachey, R.E.

3856. The right hind cannon-bone, or confluent metatarsus, of the Yak (*Bubalus grunniens*). *Presented by Captain Strachey, R.E.*

3857. The right hind cannon-bone, longitudinally bisected, of the Yak (*Bubalus grunniens*). *Presented by Captain Strachey, R.E.*

3858. The proximal phalanges of the principal pair of digits of the fore-foot of the Yak (*Bubalus grunniens*). *Presented by Captain Strachey, R.E.*

3859. The proximal phalanges of the principal pair of digits of the hind-foot of the Yak (*Bubalus grunniens*). *Presented by Captain Strachey, R.E.*

If the foregoing osteological specimens from the hoofed animals with the digits in even number be compared together, they will be found, notwithstanding the difference of form, proportion and size presented by the Hippopotamus, Wild Boar, Vicugna and Chevrotain, to agree in the following points, which are the more significative of natural affinity when contrasted with the skeletons of the hoofed animals with digits in even number. Thus, in the even-toed or 'artiodactyle' Ungulates, the dorso-lumbar vertebræ are the same in number, as a general rule, in all the species, being nineteen. The rare exceptions appear to be due to the development, rarely to the suppression, of an accessory vertebra as an individual variety, the number in such cases not exceeding twenty or falling below eighteen, and the supernumerary vertebra being most usually manifested in the domesticated and highly-fed breeds of the common Hog. The recognition of this important character appears to have been impeded by the variable number of moveable ribs in different species of the Artiodactyles, the dorsal vertebræ, which these ribs characterize, being fifteen in the Hippopotamus and twelve in the Camel: and the value of this distinction has been exaggerated owing to the common conception of the ribs as special bones, distinct from the vertebræ, and their non-recognition as parts of a vertebra equivalent to the neurapophyses and other autogenous elements. The discovery of the pleurapophyses under the condition of rudimental ribs attached to the ends of the lumbar diapophyses in the Wombat (No. 1792), the fœtal Pig and some other quadrupeds, which afterwards become suturally attached or anchylosed, and the pleurapophysial nature of a part of the so-called perforated transverse process of the cervical vertebra, as exemplified in Nos. 23 and 33, show that the anthropotomical definition of a dorsal vertebra, as one that supports ribs, is inapplicable to the Mammalia generally, and is essentially incorrect. It is convenient, in comparative tables of vertebral formulæ, to denote the number of those vertebræ of the trunk in which the pleurapophyses remain free and moveable, constituting the 'ribs' of Anthropotomy; but the differences sometimes occurring in this respect, in individuals of the same species, have their unimportance manifested when the true nature of a rib is recognized. The vertebral formulæ of the Artiodactyle skeletons above described show that the difference in the number of the so-called dorsal and lumbar vertebræ does not affect the number of the entire dorso-lumbar series: thus the Indian Wild Boar (No. 3248) has *d* 13, *l* 6, = 19; the Domestic Hog (No. 3266) and the Peccari (No. 3380) have *d* 14, *l* 5, = 19; the Hippopotamus (No. 3404) has *d* 15, *l* 4, = 19; the Gnu (No. 3808) and Aurochs (No. 3819) have *d* 14, *l* 5, = 19; the Ox (No. 3825) and most of the true Ruminants have *d* 13, *l* 6, = 19; the aberrant Ruminants (Nos. 3445, 3482 & 3489) have *d* 12, *l* 7, = 19: these facts illustrate the natural character and true affinities of the Artiodactyle group. They are further illustrated by the absence of the third trochanter in the femur, and by the place of perforation of the medullary artery at the fore and upper part of the shaft, as in the Hippopotamus, the Hog, and most of the Ruminants. The fore part of the astragalus is divided into two equal or subequal facets: the os magnum does not exceed, or is less than, the unciforme in size, in the carpus; and the ectocuneiform is less, or not larger, than the cuboid, in the tarsus. The digit answering to the third in the pentadactyle foot is unsymmetrical, and forms, with that answering to the fourth, a symmetrical pair. If the species be horned, the horns form one pair or two pairs; they are never developed singly and symmetrically from the median line. The post-tympanic does not project downward distinctly from the mastoid, nor supersedes it in any Artiodactyle; and the paroccipital always exceeds both in length. The bony palate extends further back than in the Perissodactyles; the hinder aperture of the nasal passages is more vertical and commences posterior to the last molar tooth. The base of the pterygoid process is not perforated by the ectocarotid artery. The crowns of the premolars are smaller and less complex than those of the true molars, usually representing half of such crown. The last milk-molar is trilobed.

To these osteological and dental characters may be added some important modifications of internal structure, as *e. g.* the complex form of the stomach in the Hippopotamus, Peccari, and Ruminants, the comparatively small and simple cæcum, and the spirally folded colon, which equally indicate the mutual affinities of the even-toed or Artiodactyle hoofed quadrupeds and their claims to be regarded as a natural group of the *Ungulata*. Many extinct genera, e. g. *Chœropotamus, Anthracotherium, Hyopotamus, Dichodon, Merycopotamus, Xiphodon, Dichobune, Anoplotherium,* have been discovered, which once linked together the now broken series of *Artiodactyla,* represented by the existing genera *Hippopotamus, Sus, Dicotyles, Camelus, Moschus, Camelopardalis, Cervus, Antilope, Ovis,* and *Bos* *.

Order CARNIVORA.

Family *Phocidæ* (Walrus, Seals).

Genus *Trichecus.*

Dental formula :—$i\,\frac{3-3}{2-2},\ c\,\frac{1-1}{0-0},\ m\,\frac{4-4}{4-4}=28.$

3860. The skeleton of the Walrus (*Trichecus Rosmarus*).

The vertebral formula is :—7 cervical, 14 dorsal, 6 lumbar, 3 sacral, and 9 caudal. The last cervical has the transverse processes imperforate. Nine pairs of ribs directly join the sternum, which consists of eight bones. The os penis is attached to this skeleton. The young Walrus has three teeth in each premaxillary bone and two on each side of the fore part of the mandible : they soon disappear, except the outer pair of upper incisors, which remain close to the maxillo-premaxillary suture, on the inner side of the long canine tusks, and by their thick obtuse form seem to commence the series of small and simple molars. In the adult there are usually three molars on each side, behind the permanent molariform incisor, and there are four similar teeth on each side of the lower jaw, the anterior one passing into the interspace between the upper incisor and first molar, and therefore being the homotype of that molar. A fourth upper molar (or fifth, counting from and including the molariform incisor) is occasionally present in the young Walrus, and the dental formula as given above will derive illustrations from the descriptions of the following crania : they do not, however, afford the means of distinguishing the teeth called 'molar' into 'premolars' and 'true molars,' and the molariform tooth in the premaxillary bone will be included in the series of molars, as enumerated in the succeeding descriptions.

The food of the Walrus consists of sea-weed and bivalves : the molars are well adapted to break and crush shells ; fragments of a species of *Mya* have been found, with pounded sea-

* For a further illustration of the affinities of the *Ungulata* the reader is referred to the "Description of two extinct Anthracotherioid Animals," by Prof. Owen, in the 'Quarterly Journal of the Geological Society,' November 1847.

weed, in the stomach. The canine tusks serve as weapons of offence and defence, and to aid the animal in mounting and clambering over blocks of ice in the Polar seas which it frequents.

Presented by Colonel Sabine, R.E.

3861. The skull of a male Walrus (*Trichecus Rosmarus*).

The canine tusks are nineteen inches and a half long, measured from the rim of the alveolus. The superoccipital inclines a little upwards and forwards, is divided by a median crista, and is bounded above by a broad rugged tract. The paroccipitals are broad, but not very prominent: the hinder surface of the skull is much extended laterally by the great development of the mastoids. The zygomatic process of the squamosal is remarkably thick. The molar sends up a lofty postorbital process: the maxillary developes a large but low sub-bifid antorbital process. There is a large oval vacuity in the lateral walls of the posterior nares. The skull is singularly expanded, short, obtuse, and as it were truncated anteriorly, and, being constricted between the orbits, the upper surface presents an hour-glass form. The thick parietes of the cranium have been laid open on the right side, exposing the cranial cavity. The bony tentorium, the large and shallow sella turcica, with anterior and posterior clinoid processes, and the prominent crista galli, may be noticed. Most of the sutures of this cranium have become obliterated. The basioccipital is subcarinate below. The petrosal terminates below in three obtuse processes, but there is no bulla ossea. The pterygoid process is perforated by the ectocarotid. The bony roof of the palate is very concave towards the mouth, and terminates behind by a broad biangular notch. There are four molar teeth on each side of the upper jaw, worn down obliquely, as usual, to nearly the level of their alveoli. There is no trace of incisors or their sockets. The lower jaw is thick and massive: the rami are confluent at the symphysis, with short obtuse angular tuberosities, and with the condyles on a level with the lower border. The last molar on the outside has been shed.

Presented by the Lords of the Admiralty.

3862. The skull of a larger and older male Walrus (*Trichecus Rosmarus*).

It shows the great development of the mastoids, and the well-marked ridge dividing the nasal and maxillary from the smoother frontal surface. Behind the four upper molars there is the socket of a smaller fifth tooth on the right side. There is a corresponding fifth small socket on each side of the lower jaw.

Presented by the Lords of the Admiralty.

3863. The skull of an old male Walrus (*Trichecus Rosmarus*).

The remains of an incisor are seen in the right premaxillary, and behind the four ordinary molars there is the socket of a fifth small molar on each side of the upper jaw, and a sixth still smaller socket on the left side. The lower jaw shows only the ordinary four molars on each side.

Presented by the Lords of the Admiralty.

3864. The mutilated cranium of a very large male Walrus (*Trichecus Rosmarus*).

The margin of the foramen magnum has been sawn off, exposing the lateral sinuses. The

course of the entocarotid canal may be traced on the right side. The fracture of the base of the zygomatic process of the right squamosal shows the coarse osseous texture of its swollen part. Behind the four normal molars there are two small shallow alveoli on each side, which are so close together as to appear like the socket of a tooth with a bifid base. The lower jaw has four molars on each side, but with the remnant of the socket of a much smaller tooth anterior to the first of the left side.

Hunterian.

3865. The lower jaw of a large Walrus (*Trichecus Rosmarus*).

The fourth molar on each side appears to have been smaller than usual.

Hunterian.

3866. A mutilated cranium of a Walrus (*Trichecus Rosmarus*), from which all the teeth have been removed, together with the major part of the occipital bone.

The entocranial part of the petrosal is depressed with an obtuse bifid apex, without any cerebellar pit. The foramina lacera anteriora are remarkable for their very great size. The base or roof of each socket of the canine has processes of bone projecting like stalactites into the cavity. Anterior to the first of the four normal molar sockets, which, as above remarked, is by its position an incisor, there is a smaller socket for another incisor in each premaxillary.

Hunterian.

3867. The cranium, in three transverse sections, of a large male Walrus (*Trichecus Rosmarus*).

The posterior section shows the density of the cranial walls, gradually degenerating into a coarse cellular texture, in the enormous mastoids. It also shows the form and connections of the bony tentorium, and the termination of the meatus auditorius, and the almost hemispheric, smooth, tympanic cavities. The middle section shows the commencement of the eustachian tubes from these cavities, the sella with the posterior clinoid ridge, the long chiasmal tract, and the rhinencephalic fossa divided by the crista galli. The anterior section shows the area of the large antorbital canal, and the shape of the nasal fossæ, which contract as they pass forwards to the vertical external nostril. Part of the large and complex turbinal is preserved on the right side.

Hunterian.

3868. The skull, with the dried skin of the head, vertically and longitudinally bisected, of a female Walrus (*Trichecus Rosmarus*).

This specimen shows the small vertical crescentic nostrils, and the still smaller apertures of the eyelids, with the short thick bristles or their sockets on the upper lip. The septum narium is preserved in the left half of the section: the osseous part is formed by the canaliculate vomer and the coalesced plates of the prefrontals, dividing the posterior halves of the olfactory chamber. The thick parietes of the skull show a coarse diploë. The lateral sinuses are completely surrounded by bone. The course of the vein which perforates the back part

of the parietals, and its termination in the longitudinal sinus may be traced. The bony tentorium terminates above the base of the petrosal; a thick, smooth ridge has entered the lower half of the fissure between the anterior and posterior cerebral lobes. A similar but shorter ridge from the inner side of the frontal more completely defines the rhinencephalic chamber. The left ramus of the lower jaw has been fractured, and had become the seat of caries during the lifetime of the animal. The right moiety exposes the inner surface of the large and complex turbinals: an elliptic foramen, three lines by five, leads from the lower and outer corner of the rhinencephalic fossa into the back part of the orbit between the orbitosphenoids and frontals. The venous fossa on the inner side of the condyles is divided by a bony bar in both sections. The natural contour of the wide sphenopalatine vacuity is well seen in this skull.

Hunterian.

3869. The skull of a Walrus (*Trichecus Rosmarus*). *Hunterian.*

3870. The skull of a Walrus (*Trichecus Rosmarus*). *Hunterian.*

3871. The skull of a Walrus (*Trichecus Rosmarus*). *Hunterian.*

3872. A longitudinal section of the cranium of a Walrus (*Trichecus Rosmarus*), in which the bony tentorium, the cribriform plate of the æthmoid bone, &c., are shown. *Hunterian.*

3873. A transverse section of the cranium of a young Walrus (*Trichecus Rosmarus*), showing the bony tentorium. *Hunterian.*

3874. The skull of a young male Walrus (*Trichecus Rosmarus*).

The remains of the sutures show that the alisphenoid is excluded from the parietal by the junction of a small part of the frontal with the squamosal on both sides. There is no trace of a lacrymal bone, but a small elliptical canal perforates the base of the antorbital process of the frontal slightly upwards. The maxillary portion of the skull is less broad in proportion to the cranial part than in the older Walruses. There is a small incisive socket and a rudiment of a tooth on the left side, anterior to the first of the four normal molar teeth, and the point of this tooth is just appearing, whilst the crowns of the three others are obliquely worn: there is a small socket behind the four normal molars of the lower jaw; that on the left side contains a rudimental tooth.

Presented by the Lords of the Admiralty.

3875. The skull of a young female Walrus of about the same age.

The left premaxillary has a conical incisor anterior to the four normal molars. The small, low, conical, enamelled summits of these teeth are still retained, and show one or two longitudinal impressions on the inner side. There is the mark of a bony cicatrix behind the last molar, as if there had been an obliterated alveolus. The lower jaw has the four normal molars on each side, the last being the smallest: they likewise show their primitive enamelled summits.

Presented by the Lords of the Admiralty.

3876. The skull of a young Walrus (*Trichecus Rosmarus*).

Each premaxillary shows the cicatrix of the small obliterated incisive alveolus anterior to the first of the four normal grinders, and there is a shallow, partly bifid, socket of a small molar behind the same series on each side. The lower jaw shows the four normal molars on each side. Remains of the enamelled summits are retained on most of these teeth.

Hunterian.

3877. The cranium of a young female Walrus (*Trichecus Rosmarus*).

The socket of the first of the four normal molars is wholly in the premaxillary, giving further proof of the accuracy of the determination of this tooth as the outer incisor. A vertical section has been removed from the right mastoid, showing the compact structure of its base, and the coarse structure of its terminal tuberosity.

Presented by Sir John Richardson, M.D., F.R.S.

3878. The upper and lower jaws of a large Walrus (*Trichecus Rosmarus*).

The posterior section exposes the large and complex turbinals, and the thick and compact bony 'septum narium.' The turbinals quite block up the entry to the nasal meatuses. There is the remnant of a small circular socket behind the four normal molars, but this is not repeated in the lower jaw of this specimen.

Hunterian.

3879. The upper and lower jaws, with the dried skin covering them, of a female Walrus (*Trichecus Rosmarus*).

This shows only the four normal grinders on each side of both upper and lower jaws.

Hunterian.

3880. The upper jaw of a male Walrus (*Trichecus Rosmarus*).

The sockets of the small incisors anterior to the four normal molars are well preserved and deep. The canines are more slender, more recurved, and more incurved than usual. The posterior section shows the abrupt descent of each nasal meatus into the palatal process of the maxillary, and the compact character of the osseous tissue.

Presented by Henry Cline, Esq.

3881. The upper jaw of a female Walrus (*Trichecus Rosmarus*).

There is a minute molar behind each series of the four normal molars.

Hunterian.

3882. The left maxillary and premaxillary bones of a young Walrus (*Trichecus Rosmarus*).

The premaxillary shows the socket of the small incisor, together with that which forms the first of the four normal grinders; behind which there is a small circular socket of another molar tooth. The premaxillary is here seen to rise and form part of the suture with the nasal bone. The malar is completely suspended in the middle of the zygomatic arch.

Hunterian.

3883. The left premaxillary, and part of the maxillary with the socket of the canine, of a large Walrus (*Trichecus Rosmarus*).

The outer wall of this socket has been sawn off, showing the large, open, conical cavity for the persistent pulp, into which stalactitic-like ossifications have shot from the apex of the pulp-cavity, and the base of the socket.

By a comparison of the dental system in the preceding extensive series of the skulls of the Walrus, it will be seen that, in addition to the long canine tusk, four teeth are retained as functional grinders on each side of the upper jaw, and that four similar grinders are present in each ramus of the lower jaw. The first of the upper grinders, by its relation to the premaxillary, must be held to be an incisor answering to *i* 3 of the typical series. There is a smaller incisor anterior to this, which is less constant and less permanent, and answers to *i* 2. The second, third and fourth are probably premolars: the smaller and less constant tooth behind them may be the first of the true molars, *m* 1, but the extent to which the normal dental formula is manifested in this singularly modified Seal can only be determined by examination of the jaws of the fœtus.

Hunterian.

3884. The otosteals, called malleus, incus, and stapes, of a Walrus.

Presented by Sir John Richardson, M.D.

3885. The long canine, or tusk, of a Walrus. *Hunterian.*

3886. The tusk of a Walrus. *Hunterian.*

3887. The tusk of a Walrus. *Purchased.*

3888. The tusk of a Walrus. *Purchased.*

3889. The tusk of a Walrus. *Mus. Brit.*

3890. The tusk of a Walrus. *Mus. Brit.*

3891. A small tusk of a Walrus. *Mus. Brit.*

3892. The tusk of a Walrus. *Mus. Brit.*

3893. The tusk of a Walrus, with a portion of the alveolar process attached. *Hunterian.*

3894. The tusk of a Walrus. *Hunterian.*

3895. The tusk of a Walrus. *Hunterian.*

3896. The tusk of a Walrus. *Mus. Brit.*

3897. The tusk of a Walrus. *Mus. Brit.*

3898. The tusk of a Walrus. *Mus. Brit.*

3899. The tusks of a Walrus.

From the western coast of North America. *Hunterian.*

3900. A section of the growing tusk of a Walrus. *Hunterian.*

3901. Longitudinal sections of the tusk of a Walrus. *Hunterian.*

3902. Longitudinal sections of the tusk of a Walrus. *Hunterian.*

3903. Transverse sections, deprived of the calcareous salts by acid, of the tusk of a Walrus. *Hunterian.*

3904. A molar tooth from the right side of the upper jaw of a Walrus. *Hunterian.*

3905. Two molar teeth from the lower jaw of a Walrus. *Hunterian.*

3906. The os penis of a large Walrus.

The surface has been polished.

Hunterian.

3907. The os penis of a Walrus. *Presented by Lieut. Colquhoun.*

3908. The os penis of a Walrus. *Hunterian.*

3909. The os penis of a Walrus.

Presented by Sir Everard Home, Bart., V.P.R.S.

3910. The os penis of a Walrus.

This shows a united fracture of the bone.

Presented by Mr. Portis.

3911. The os penis of a Walrus. *Hunterian.*

3912. The os penis of a Walrus. *Hunterian.*

3913. The os penis of a Walrus. *Hunterian.*

3914. The os penis of a Walrus. *Hunterian.*

3915. The os penis of a young Walrus.

From the Northern Expedition, H.M.S. 'Isabella,' 1818.

Presented by the Lords of the Admiralty.

3916. The os penis of a young Walrus. *Hunterian.*

3917. The os penis of a young Walrus. *Purchased.*

3918. The os penis of a Walrus. *Hunterian.*

3919. The pubic extremity of the os penis of a Walrus, longitudinally bisected.
Purchased.

Genus *Cystophora.*

Dental formula:—$i\,\frac{2-2}{1-1},\ c\,\frac{1-1}{1-1},\ m\,\frac{5-5}{5-5}=30.$

3920. The skull of the great Proboscis-Seal, or Sea-Elephant (*Cystophora proboscidea*).

Besides its superior size, it differs from that of the *Cystophora cristata*, No. 3935, in the form and proportions of the palatine bones, the posterior borders of which present three notches; in the relatively shorter extent of the nasal processes of the premaxillaries; in the greater prominence of the antorbital processes of the maxillaries; and the absence of the depression beneath the antorbital foramen. The enamelled summits of the teeth are smoother, those of the middle molars presenting only two grooves on the outer side, which converge to the point. The superior dimensions of the teeth are chiefly due to the expansion of their fangs, which are simple and covered with a very thick mass of cement. The sagittal crista is scarcely indicated, the temporal ridges terminating at the sides of the sagittal suture, but the occipital crest is conspicuous for its great height and thickness; the lower border of the superoccipital presents two vertical venous perforations, which are likewise present in the skull of the young *Cystophora*. Traces of the suture between the basisphenoid and the basioccipital and between the basisphenoid and presphenoid still remain. The entocarotid canals at the back part of the petrosals are very conspicuous: there are no ectocarotid canals. The paroccipitals are less prominent than in the *Cystophora cristata*. The occipital condyles meet upon the basioccipital.

Purchased.

3921. The skull of the great Proboscis-Seal (*Cystophora proboscidea*).

The posterior border of the bony palate presents two notches; the smaller middle notch is hardly perceptible in this skull.

Mus. Brookes.

3922. The cranium, transversely bisected across the tympanic cavities, of the great Proboscis-Seal (*Cystophora proboscidea*).

The posterior section shows the rudimental development of the bony tentorium, as compared with that in the *Otaria leonina*, No. 3971, the great thickness and coarse diploë of the walls of the cranium formed by the parietals, the extremely small proportion of the squamosal which enters into the formation of those walls, and the dense structure of the mastoid, where it coalesces with the base of the zygomatic process. The two orifices of the vertical

venous sinuses terminating above the foramen magnum are present in this as in the preceding skulls of the same species. The basioccipital is also perforated by a similar venous sinus near its middle part. The petrosal is excavated by a deep but narrow cerebellar fossa; a long groove or notch upon its upper surface leads to the meatus auditorius internus: the petrosal is, as it were, bent upwards upon this groove. The tympanic bulla supports the under part of the petrosal like a capsule. The tympanic cavity is divided into two chambers, one above the termination of the meatus externus, the other beneath and internal to it. The carotid canal perforates the tympanic internal to this part of the chamber.

In the anterior section the oblique expanded inner termination of the meatus auditorius is shown, and its relative position to the small suprameatal and large inframeatal divisions of the tympanic cavity. The Eustachian groove commences from the angle between those divisions, and grows deeper and wider until it forms the canal at the fore part of the tympanic bone. The rhinencephalic fossa is divided by a strong and sharp crista galli. The frontal bones form an unusually small proportion of the cranial cavity: they are extensively overlapped posteriorly by the parietals.

Presented by the Ven. Archdeacon Williams.

3923. The anterior portion of the upper jaw of the great Proboscis-Seal (*Cystophora proboscidea*).

The external walls of the alveoli of the canines and molars of the right side of both jaws have been removed; showing the great size of the root as compared with the enamelled crown, the longitudinal prominence on the outer side of the crown of the upper canine, the progressive diminution in the length of the upper molars, and the near equality in the length of the lower molars: the roots of the teeth converge slightly towards their implanted extremities in both series.

These jaws are from the original specimen brought to England by Lord Anson from the South Seas, in 1744.—See Anson's 'Voyage round the World,' p. 122, pl. 19, where the species is called the "Sea Lion."

Mus. Brit.

3924. The right upper canine of the *Cystophora proboscidea.* *Hunterian.*

3925. The right upper canine of the *Cystophora proboscidea.* *Hunterian.*

3926. The right upper canine of a somewhat older individual of the *Cystophora proboscidea.* *Presented by Sir William Blizard, F.R.S.*

3927. The right upper canine of a younger specimen of the *Cystophora proboscidea.* *Hunterian.*

3928. The left upper canine of the *Cystophora proboscidea.* *Purchased.*

3929. The left upper canine of probably a female of the *Cystophora proboscidea.*
Hunterian.

3930. The right lower canine of the *Cystophora proboscidea.*
Presented by Sir William Blizard, F.R.S.

3931. The right lower canine, with the enamel smoothly and unusually abraded from the side of the crown, of the *Cystophora proboscidea.* *Hunterian.*

3932. The left lower canine of the *Cystophora proboscidea.* *Hunterian.*

3933. The left lower canine of the *Cystophora proboscidea.* *Hunterian.*

3934. The skull of a young male Seal, from the 'Isles Creusettes' (*Cystophora proboscidea*?).

It differs from the *Cystophora cristata* in the greater length of the enamelled crowns of the canines and the smoother character of the enamel: the crowns of the molars are relatively larger, are separated by a less-marked constriction from the fang, and the enamel does not present the same wrinkled character. The palatal processes of the palatines form a transverse quadrate plate more deeply emarginate behind. The cranial and acoustic cavities are larger, indicating the skull to belong to the young of a larger species of *Cystophora.* The conjoined portions of the malar and zygomatic form a more abrupt and elevated rising from the middle of the zygomatic arch. The premaxillaries do not ascend upon the sides of the nasal aperture, and do not articulate with the nasals. The nasal processes of the maxillaries send out strong antorbital processes. There are traces of a suture partially dividing the orbital from the rostral part of the maxillary, extending from the side of the nasal aperture into the antorbital foramen. The orbital part of the maxillary thus in part detached from the rostral part might be compared with a large lacrymal, but there is no trace of a distinct bone or of any lacrymal perforation in this young cranium. Traces of the sutures between the basioccipitals and the exoccipitals and between these bones and the superoccipital are still retained. This may possibly have belonged to a young individual of the *Cystophora proboscidea.*

Purchased.

Subgenus *Stemmatopus*, F. Cuvier.

3935. The cranium of a male Hooded Seal (*Cystophora cristata*).

The external incisors are like small canines: the molars have very short, low, subelliptic, conical crowns, with the enamel longitudinally wrinkled and divided by a well-marked constriction from the expanded fangs, which are sub-bifid and short. The superoccipital inclines from below upwards and forwards. The temporal cristæ have not met above the parietal

bones; there is a small vacuity in the thin basioccipital. The pterygoid processes are not pierced for the ectocarotids. The posterior border of the bony palate is slightly concave: the palatal portions of the palatines form together almost a square plate of bone. The maxillaries and premaxillaries form a short and narrow prominence in front of the orbits: the premaxillaries do not reach the nasals.

From the Arctic Seas.

Mus. South.

3936. The jaws and some other portions of the skull of a species of Hooded Seal, nearly allied to, if not identical with, the *Cystophora cristata.*

The forms and proportions of the enamelled crowns of the teeth closely correspond with those in No. 3935. The premaxillary bones present the same proportions; the antorbital processes of the maxillary are relatively as feeble. The chief portion of the skull includes the neural arches of the two anterior cranial vertebræ, the constituent elements of which are numbered on coloured labels according to the TABLE OF SYNONYMS. The complexity of the large turbinals is well shown in the maxillary portions of the skull. The teeth, which are contiguous at this immature period, become separate from each other in the subsequent growth of the jaws.

From Newfoundland.

Presented by Edward Rushworth, Esq.

Genus *Stenorhynchus*

Dental formula:—$i\,\frac{2-2}{2-2}$, $c\,\frac{1-1}{1-1}$, $m\,\frac{5-5}{5-5}=32$.

3937. The skeleton of the Saw-toothed Seal (*Stenorhynchus serridens*).

The vertebral formula is:—7 cervical, 15 dorsal, 5 lumbar, 3 sacral, and 11 caudal. The metapophyses commence as tubercles outside the prezygapophysis on the second dorsal, are distinct on the third dorsal, pass on the fore part of the diapophysis in the fourth, and continue rudimental as far as the tenth dorsal, on which they are well and distinctly developed; they again pass upon the outside of the prezygapophysis in the eleventh and twelfth dorsals, and so continue throughout the lumbar, sacral, and anterior caudal vertebræ. The anapophyses are mere rudimental projections from the back part of the diapophysis. The transverse processes of the axis are more developed than in the *Phoca grœnlandica*; they show as distinctly as in the other cervicals, but on a smaller scale, the pleurapophysial and diapophysial parts of the process. The cervical and anterior dorsal vertebræ have a hypapophysial ridge, which, in the latter, is produced into a tuberosity: the lumbar vertebræ are characterized by a pair of hypapophyses from near the hinder end of the centrum. These processes indicate the great development of the anterior vertebral muscles called the psoæ and longi colli, and relate to the great share which the trunk-vertebræ take in the locomotion of the Seal, especially on dry land. The cranium of this Seal is longer and more slender, and the facial part tapers more gradually from the expanded cranium, than in the *Stenorhynchus leptonyx*. The paroccipitals are small, but distinct. The petrosals are perforated posteriorly for

the entocarotids; the pterygoid processes are not perforated for the ectocarotids. The temporal ridges meet upon the sagittal suture, but do not develope a crista. The malar bones are slender, strongly curved, suspended in the middle of the zygomatic arch, bifurcate posteriorly, the upper prong rising to form with the zygomatic process of the squamosal, the postorbital process. There is no corresponding process from the frontal. The antorbital process of the maxillary is small, but distinct. The premaxillaries are narrow and slender, but do not reach the nasals. The posterior border of the bony palate is terminated by a deep semi-elliptic notch. The digits of the fore paddle progressively decrease in length from the first to the fifth, but the first, or 'pollex,' preserves the normal inferior number of phalanges: its metacarpus has twice the length and thickness of that of the index, and the proximal phalanx has nearly the same proportions. In the hind paddle the first and fifth digits are the longest, the middle digit is the shortest, but the first, or 'hallux,' has but two phalanges as usual. The specific distinction of this Seal is chiefly shown by the structure of the molar teeth. The three anterior molars on each side of both jaws are four-lobed, having two lobes behind the principal one, and one in front of it; the remaining molars, two on each side of both jaws, are five-lobed, the principal lobe having one smaller lobe in front, and three lobes behind it. These lobes in all the molars are separated by as deep notches as the fewer lobes are in the teeth of the *Stenorhynchus leptonyx*, but their summits are less acute.

The skeleton was prepared from a specimen obtained in a high latitude in the Australian Seas, during the Antarctic Expedition.

Presented by Robert M'Cormick, Esq., F.R.C.S., Surgeon to H.M.S. Terror.

3938. The skull of the Small-clawed Seal (*Stenorhynchus leptonyx*).

This is the original of Mr. Clift's figure, published in Home's papers in the 'Philosophical Transactions' for 1822, pl. 29, and in his 'Lectures on Comparative Anatomy,' vol. iv. pl. 20. It was obtained from the island of New Georgia, near the Antarctic ice. It agrees in general form and characters with the skull of the *Stenorhynchus serridens*, but the lower fourth of the malar is proportionally longer, extending nearly to the glenoid cavity: the ascending processes of the premaxillaries are relatively longer: the lower border of the mandibular ramus is straighter, and the symphysis shorter and more abruptly bent upwards: but the chief difference is in the crowns of the molar teeth, which are deeply cleft into three cusps, the middle one being the longest. The first molar above has a small accessory tubercle on the inner expanded part of the cingulum, and the cingulum is well developed at the same part of the crown of the three succeeding molars: it is wanting in the lower molar teeth. All the molars are two-fanged, but the fangs of the first are connate in both jaws. There is a single superoccipital venous canal, which opens within the border of the foramen magnum: the ligament completing the contour of the orbit is preserved on the right side.

Presented by William Keane, Esq.

3939. A mutilated cranium of the Small-clawed Seal (*Stenorhynchus serridens*).

The calvarium has been removed, exposing the capacious cerebral chamber and the thinness of its lateral walls. The basioccipital shows two smooth depressions, the anterior one being

the deepest. The sella turcica is very shallow, and is defined only by a posterior clinoid ridge, between which and the platform for the optic chiasma there is a long tract. The petrosals terminate by obtuse subdepressed apices. The foramina lacera anteriora are of unusual size, and appear to include the foramina rotunda: there is no ridge indicating the division between the anterior and middle lobes of the cerebrum. The rhinencephalic fossæ are small, but deep and well-defined, and completely divided by a broad and thick crista galli.

Presented by Thomas Chevalier, Esq.

3940. The right moieties of the upper and lower jaws, with the teeth, of the Small-clawed Seal (*Stenorhynchus leptonyx*).

The outer alveolar wall has been removed, showing their fangs: these are single in the first molar, double in the other four molars; they are long in all, but are not made larger, by the external cement, than the enamelled crown.

Presented by Prof. Owen, F.R.S.

3941. The first and second molar teeth, left side, lower jaw, of the Small-clawed Seal (*Stenorhynchus leptonyx*). *Presented by Prof. Owen, F.R.S.*

Genus *Pelagius*.

Dental formula:—$i\ \frac{2-2}{2-2},\ c\ \frac{1-1}{1-1},\ m\ \frac{5-5}{5-5}=32.$

3942. A mutilated cranium of the Monk-Seal (*Pelagius monachus*).

As in the preceding species, the molar teeth, with the exception of the first in both jaws, are implanted by two roots; but their crown is short, subcompressed, conical, with a cingulum strongly developed on the inner side, and developing a small anterior and posterior accessory cusp. The entocarotid canal perforates the back part of the petrosal, as in the *Phoca grœnlandica*: the ectocarotid does not pierce the pterygoid process. The upper contour of the skull presents a sigmoid curve. The upper jaw is much less deep than in the *Halichœrus*, No. 3943; the canines are relatively larger, and the nasal bones are much shorter. The temporal ridges meet, and form a low sagittal crest over the posterior half of the frontals and parietals.

Hunterian.

Genus *Halichœrus*.

Dental formula:—$i\ \frac{3-3}{2-2},\ i\ \frac{1-1}{1-1},\ m\ \frac{5-5}{5-5}=34.$

3943. The skull of the Grey Seal (*Halichœrus Gryphus*).

This appears to be the original of the figure by Mr. Clift, in plate 27 of Home's paper in the 'Philosophical Transactions' for 1822. It is certainly of the same species, and belongs

to an imperfect skeleton stated to have been presented to Mr. Hunter by a Mr. Oxendon,—probably the gentleman who went two years in succession to the Orkney Isles for the purpose of shooting it. This animal had been known for thirty summers to come to the same rock, and lie basking in the sun. It had a grey beard. The dental formula is the same as in the *Phoca grœnlandica*, but the canines are relatively larger, and the outer incisors still more so. The molars are more simple and conical; only the rudiment of an accessory basal cusp is seen on the inferior ones. The skull is remarkable for the straightness of its upper contour and the sudden bending down of the equally straight line formed by the deep and narrow premaxillaries. There is a deep depression in the superoccipital, overarched by a thickly-developed occipital ridge; the squamosal and malar rise abruptly at their junction at the middle of the zygoma. The acoustic bullæ have been broken open, showing the expanded and oblique middle opening of the meatus auditorius. The olfactory fossæ are also broken open, and the large and complex turbinal bone is shown in the right compartment. The bony palate is terminated behind by a semicircular notch.

Hunterian.

The following, to No. 3960 inclusive, are parts of the same skeleton of the *Halichœrus Gryphus*:—

Hunterian.

3944. The atlas.

The perforation in the transverse process for the vertebral artery expands into a depression as if for a sinus on its under part: from this there is a communication directly with the neural canal, but the artery has proceeded forwards, notched the fore part of the process, and perforated the fore part of the neural arch.

3945. The seventh cervical vertebra.

The transverse processes are imperforate, and consist simply of diapophyses. The lower surface of the centrum is longitudinally carinate.

3946. The tenth dorsal vertebra.

It has both metapophyses and anapophyses. The diapophysis is indicated by a rough surface for the attachment of the costal ligament above the broad articular surface for the head of the rib. The lower surface of the centrum is smooth and convex.

3947. A lumbar vertebra.

The anapophysis is reduced to a small ridge. The diapophyses are lengthened out by coalesced rudiments of ribs. The line of junction is indicated by a ridge: the metapophyses continue to be very strongly developed.

3948. The sacrum.

It consists of four anchylosed vertebræ. The spines have partly coalesced at their base. The intervertebral foramina are divided at their outlets by the coalescence of the diapophyses.

3949. An anterior thoracic rib.

It shows the distinct head and tubercle.

3950. A middle thoracic rib.

The tubercle is less distinct.

3951. A posterior thoracic rib.

The tubercle has subsided.

3952. The right scapula.

It shows a great extension of the inferior costa, by the coalescence of the coarsely ossified suprascapula. The acromion is more rudimental than in the *Phoca grœnlandica.* The coracoid tubercle is almost obsolete.

3953. The left humerus.

The inner condyle is perforated, and it repeats the characteristics of the same bone in the *Phoca grœnlandica.*

3954. The left radius.

It is greatly expanded and deeply grooved at its distal half.

3955. The left ulna.

The olecranon is remarkably expanded and compressed.

3956. The ossa innominata.

A deep concavity of the outer surface of the short and broad ilium is worthy of notice.

3957. The right femur.

The lower periphery of the head is notched.

3958. The right patella.

3959. The right tibia and fibula.

They are anchylosed at their proximal ends.

3960. The metacarpal bone of the outer digit of the right hind fin.

Genus *Phoca.*

Dental formula:—$i\,\frac{3-3}{2-2}$, $c\,\frac{1-1}{1-1}$, $m\,\frac{5-5}{5-5}=34$.

3961. The skeleton of the Harp-Seal (*Phoca grœnlandica*).

The vertebral formula is:—7 cervical, 15 dorsal, 5 lumbar, 4 sacral, and 8 caudal. Ten pairs of ribs directly join the sternum, which consists of eight bones. The transverse processes of the last cervical are imperforate. The neural arches of the middle dorsal vertebræ are without spines and are very narrow, leaving wide unprotected intervals of the neural canal. The bones of the neck are modified to allow of great extent and freedom of inflection. The perforated transverse processes of the third to the sixth cervicals inclusive are remarkable for the distinctness of their diapophysial and pleurapophysial parts. Metapophyses are developed on the last five dorsal vertebræ: the strong hypapophysial ridge of the lumbar vertebræ divides into two tuberous processes. These processes indicate the great development of the anterior vertebral muscles, *e. g.* the 'longi colli' and 'psoæ,' and relate to the important share which the vertebræ and muscles of the trunk take in the locomotion of the Seal-tribe, especially when on dry land, where they may be called 'gastropods,' in respect of their peculiar mode of progression. There is no trace of clavicle. The lower costa of the scapula much exceeds the upper one in breadth. The spine terminates by a short and simple acromion. The humerus is short and thick, and is remarkable for the great development of the inner tuberosity and of the deltoid ridge, which is deeply excavated on its outer side. The inner condyle is perforated. The scaphoid and lunar bones are connate. Although the pollex or the first digit exceeds the third, fourth and fifth in length, it presents its characteristic inferior number of phalanges, by which the inner border of the fin is rendered more resisting. The pelvic arch is remarkable for the stunted development of the ilia, and the great length of the ischia and pubes. The femur is equally peculiar for its shortness and breadth. The tibia and fibula present the more usual proportions, and are anchylosed at their proximal ends. The bones of the foot are much developed, and are modified to form the basis of a large and powerful fin: the middle toe is the shortest, and the rest increase in length to the margins of the foot. In this skeleton the number of phalanges of the hallux equals that of the other digits.

Hunterian.

3962. The skull of the Harp-Seal (*Phoca grœnlandica*).

It is the original of the specimen figured by Mr. Clift in Home's paper on the Skulls and Teeth of Seals, in the 'Philosophical Transactions' for 1822, plate 28, and in his 'Lectures on Comparative Anatomy,' vol. iv. tab. xix. The canines are short, but strong: the molars small and set apart, with compressed pointed crowns, the principal cusp in all but the last lower molar having one accessory basal cusp in front and two behind. The basioccipital is an extremely thin plate, and shows a large vacuity in front of the foramen magnum. The pterygoid processes are not pierced for the ectocarotids. The bony palate is terminated posteriorly by a transverse line; the suture between the maxillary and premaxillary is obliterated. The meatal portion of the tympanic is slightly bent, and directs the external auditory aperture obliquely forwards and upwards.

Hunterian.

3963. The partially separated bones of an incomplete skull of the Harp-Seal (*Phoca grœnlandica*).

The occipito-sphenoidal bone is formed, as in Man, by the coalescence of the basioccipital and basisphenoid: it shows the bony tentorium, with the ossified posterior part of the falx: the sella turcica is shallow, but well defined behind by the overhanging posterior clinoid processes: the pterygoid processes are not perforated by the ectocarotids: the thin basioccipital shows a slight vacuity. The left parietal is anchylosed to the temporal, in which the petrous portion shows the deep transverse cerebellar fossa, and the carotid canal through which a bristle is placed. In the right frontal may be seen the small rhinencephalic fossa, and the very large proportion of the bone which contributes to the formation of the orbital and olfactory chambers. The left frontal, maxillary and premaxillary bones have coalesced with the prefrontals and vomer, which latter form a complete and very extensive bony septum between the nasal passages: these are blocked up anteriorly by the sieve-like turbinals. The right ramus of the jaw has been longitudinally bisected, to show the dental canal and the sockets of the teeth. The numbers upon the bones indicate their names according to the Table of Synonyms.

Hunterian.

Genus *Arctocephalus.*

Dental formula:—$i\,\frac{3-3}{2-2}$, $c\,\frac{1-1}{1-1}$, $m\,\frac{5-5}{5-5}=34$.

3964. A mutilated cranium, wanting the lower jaw, of the Australian Ursine Seal, or 'Sea-Bear' (*Arctocephalus australis*).

The fractured frontal bones show the extension of the olfactory chambers exterior to the rhinencephalic fossa. The border of the superoccipital, forming the upper part of the foramen magnum, shows the orifices of two venous sinuses. The posterior border of the bony palate has an angular notch. The pterygoid processes are pierced for the ectocarotids. The last molar is implanted by two diverging fangs.

This skull was found eighty miles inland in South Australia.

Presented by Dr. Hobson.

3965. The upper and lower jaws, with the teeth, of an Ursine Seal, nearly allied to the *Arctocephalus lobatus*, but with the canines of the lower jaw of a smaller relative size.

The outer walls of the alveoli of the canines and molars on the right side of both jaws have been removed, showing that the four posterior upper molars are implanted each by two connate fangs. In the posterior inferior molar the two fangs become quite distinct.

Presented by Dr. Hobson.

Genus *Otaria*.

Dental formula :— $i\,\frac{3-3}{2-2},\ c\,\frac{1-1}{1-1},\ m\,\frac{6-6}{5-5}=36.$

3966. The skull of the Leonine Seal, Byron's ' Sea-Lion ' (*Otaria jubata*).

This is the skull of the original specimen—an old male—brought from Tinian Island, by Commodore Byron, in 1769, which was for many years preserved in the British Museum. The superoccipital is broader and more nearly vertical than in the preceding specimens: the basioccipital is carinate below; the paroccipitals form an obtuse angle, but are less prominent than the mastoids. The petrosals and tympanics are not expanded into a bulla ossea, but send down a subcompressed smooth tuberosity. The pterygoids are pierced by the ectocarotids. The bony palate is very long, and remarkably concave, from the bending down of its sides: its posterior border is transversely truncate. The sagittal and occipital cristæ are singularly elevated. Each frontal sends out an obtuse process near its junction with the parietal, into the middle of the extensive temporal fossa, and each developes large, horizontal, triangular, postorbital processes. The maxillaries develope antorbital processes. The nasals are short and broad, and articulate with the premaxillaries as well as the maxillaries. Most of the teeth have been lost from this old skull: the sockets show the simple fangs of the small molars: the outer incisors resemble small canines.

Mus. Brit.

3967. The skull of a male Leonine Seal (*Otaria jubata*).

The hyoidean arch remains naturally articulated to it, the stylohyals being attached by ligament to the outer side of the petrosals. The dental series is entire in the upper jaw, with the exception of the left incisor, *i* 1. The enamelled crowns of the molars are of very small size, subcompressed, conical, with a cingulum round the inner side of the base, rising into a rudimental cusp at its termination. The swollen fangs, with the thick covering of cement, project from the sockets, and are divided by a constriction from the crown. The ectocarotid canals are present, and the superorbital plates, but the processes from the posterior margin of the frontals are not developed from this skull.

Presented by Admiral Beaufort, C.B., F.R.S.

3968. The skull of a female Leonine Seal (*Otaria jubata*).

It differs from that of the male in its inferior size, but agrees with it in all the essential or non-modifiable characters. The more feeble bite and smaller temporal muscles have not

required the elevation of the temporal ridges into a parietal crest, nor any considerable development of the occipital ridge. The boundary of the large mastoid is well shown in this skull, together with the share which the paroccipital takes in the rough muscular ridge external to the petrosal. The middle surface of the basioccipital is less carinate than in the male. The entry of the carotid canal in the petrosal is more distinct from the jugular vacuity. The broad superorbital processes of the frontal are less angular. The canines and external incisors of the upper jaw are smaller, in comparison with the molars. The first and second incisors have bifid crowns. The angle of the lower jaw is produced and bent inwards more than in the male.

Presented by Admiral Beaufort, C.B., F.R.S.

3969. The skull of a female Leonine Seal (*Otaria leonina*).

The teeth have been removed from the right side of the upper and lower jaw, and are separately displayed.

Hunterian.

3970. The cranium with the hyoidean arch, but wanting the lower jaw, of the Leonine Seal (*Otaria jubata*).

In this specimen processes are developed into the temporal fossæ not only from the frontals, but also the parietals, and would seem to have divided the great crotaphite muscle into three masses. The calvarium has been removed, showing the two superoccipital sinuses descending to the condyloid fossæ; the broad arch of the bony tentorium; the ridge on the inner side of the parietal, dividing the middle from the anterior lobe of the cerebrum, parallel with the external ridge projecting into the temporal fossa, and the upper and posterior surface of the superior turbinals occupying that part of the olfactory fossa which overarches the rhinencephalic chamber: this is divided by a broad crista galli. There is a large oblong vacuity at the outer and posterior side of the nasal passages between the frontal, presphenoid, palatine and maxillary bones: the same vacuity being repeated in each of the skulls of the *Otaria leonina*, indicates that it is natural, and that it is closed by membrane in the recent animal. There is a smaller vacuity in the corresponding part of the skulls of some other species of Seals.

Presented by Admiral Beaufort, C.B., F.R.S.

3971. The vertically bisected skull of a male *Otaria jubata*.

The posterior part of the falx and the whole of the tentorium are ossified. The superoccipital sinus, commencing by a common aperture at the hinder extremity of the longitudinal sinus, diverges on each side into the substance of the exoccipitals, and terminates in a deep and wide fossa on the inner side of the condyle, from which fossa one canal leads backwards to open external to the condyle, and another downwards and inwards to terminate in the foramen jugulare. A bristle is inserted into the parietal venous sinus. The bony tentorium terminates anterior to the petrosal, which has an obtuse expanded inner apex, and shows no petrosal pit. There is no Gasserian fossa. A ridge divides the foramen ovale from the foramen rotundum. The sella turcica is broad and shallow: it is defined by posterior clinoid

processes: there are no anterior ones. The rhinencephalic fossa is narrow, but of unusual longitudinal extent: the optic nerves traverse a common canal of nearly an inch in extent before it divides. The ascending plates from the palatine processes of the maxillary form an unusually deep groove for the reception of the vomer. The anterior parts of the left upper jaw and of both rami of the lower jaw have been the seat of disease in this specimen. The individual bones in the right half of the section are numbered according to the TABLE OF SYNONYMS.

The specimen was a male ten feet in length, seven feet in girth, and was killed in Public Sound, Falkland Islands, by Lieut. Robinson, R.N.

Presented by Admiral Beaufort, C.B., F.R.S.

3972. The right external laniariform incisor of the *Otaria jubata*. *Hunterian.*

3973. The right upper and lower canines of the *Otaria jubata*. *Hunterian.*

3974. The right upper canine of the *Otaria jubata*. *Hunterian.*

3975. The right lower canine of the *Otaria jubata*. *Hunterian.*

3976. The left lower canine of the *Otaria jubata*. *Hunterian.*

3977. The skull of an *Otaria*.

It differs from the *Otaria leonina* in the angular emargination of the posterior palate, each side of the notch showing a small projection. The upper margin of the foramen magnum is pierced by two venous sinuses. The mastoid is broader than it is deep. The jugular foramina are longer than they are wide: the petrosals do not send down the wedge-shaped process. The pterygoid processes are pierced by the ectocarotids. The zygomatic arches are much more slender: the frontals form a greater proportion of the prosencephalic chamber, and have relatively smaller superorbital plates. The bony palate is much shallower than in the *Otaria jubata*. In many respects this skull is more nearly allied to the *Arctocephalus*, but the sixth socket is too distinct to permit any other inference than that it contained a tooth, which would give it the dental formula of *Otaria*.

Hunterian.

3978. The lower jaw of an *Otaria*.

This is smaller in size, and with relatively much smaller canines, than in the female *Otaria leonina*. The cingulum is less developed on the inner side of the molars.

Hunterian.

Family *Ursidæ*.

Genus *Ursus*.

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{4-4}{4-4}$, $m\,\frac{2-2}{3-3}=42$.

3979. The skeleton of a young Polar Bear (*Ursus maritimus*).

The vertebral formula is:—7 cervical, 15 dorsal, 6 lumbar, 5 sacral: the caudal series is incomplete. In this skeleton there is one more true vertebra than in that of the Black Bear (No. 4013) or Labiated Bear (No. 4037), but it may be an individual variety*. There is no trace of clavicle in any species of *Ursus*.

Mus. Brookes.

3980. The cranium of a very old male Polar Bear (*Ursus maritimus*).

The canines have been broken, the molars worn down, and the sutures obliterated. The socket of the first premolar (*p* 1) still remains on the right side, but those of all the three rudimental premolars (*p* 1, *p* 2 & *p* 3) have been obliterated on the left side. The sagittal crest commences about one inch and a half behind the postorbital processes.

Hunterian.

3981. The skull of an old male Polar Bear (*Ursus maritimus*).

Most of the sutures are obliterated. The three rudimental premolars (*p* 1, *p* 2 & *p* 3) have been retained with the fourth normally developed one (*p* 4), on the left side of the upper jaw, but the socket of the second premolar (*p* 2) has been obliterated on the right side.

From Hare Island, Baffin's Bay.

Presented by Dr. Leach, F.L.S.

3982. The skull of a large old male Polar Bear (*Ursus maritimus*).

Almost all the sutures are obliterated. The lower extremities of the occipital condyles are united by a ridge, which, however, is less prominent than in the *Ursus ferox*. Both paroccipitals and mastoids are well developed, but the latter are much the larger processes. The temporal ridges, commencing at the postorbital processes, converge at a right angle and meet at about two inches behind the orbits, and form a long and prominent sagittal crest, the upper border of which is straight; the frontal region is low and flattened: the molar teeth are relatively much smaller than in the *Ursus arctos* or *Ursus ferox*: in the interspace between the canines and last premolars are the sockets of two small premolars in both the upper and lower jaws.

Hunterian.

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* According to M. de Blainville (Ostéographie des Carnivores, *Ursus*, p. 22), the number of dorsal vertebræ in the skeleton of the Polar Bear in the Museum of Comparative Anatomy in the Jardin des Plantes is only 13, and it has 6 lumbar vertebræ, making one less than the typical number of 'true vertebræ.'

3983. The skull of a male Polar Bear (*Ursus maritimus*).

It is of equal size with the preceding, but is from a younger animal, and shows the sutures of the cranium. The commencement of the sagittal crest is here seen to be two inches in advance of the coronal suture: the posterior points of the nasals extend much further back than the nasal processes of the maxillaries. The premaxillaries join the frontals. A vertical section of the cranium has been made, showing the bony tentorium and the ridge which penetrates the fissura magna sylvii. There are two small premolars (*p* 1 & *p* 3) on each side of the upper jaw, and one premolar (*p* 1) on each side of the lower jaw, between the canine and the last or constant premolar (*p* 4).

Mus. Brit.

3984. The skull of a male Polar Bear (*Ursus maritimus*).

The occipital condyles are mutilated. It shows the same state of the rudimental premolars as in the preceding specimen.

Hunterian.

3985. The skull of a young, but nearly full-grown, Polar Bear (*Ursus maritimus*).

The first and third premolars are present on both sides of the upper jaw and on the left side of the lower jaw, the first only being retained on the right side. The occipital condyles have been sawed off.

Presented by the Lords of the Admiralty.

3986. The skull of a young, but nearly full-grown, Polar Bear (*Ursus maritimus*).

The sockets of the three rudimental premolars are present between the canine and last premolar on both sides of the upper jaw, but the first rudimental premolar only remains in the lower jaw.

Presented by William Gaitskell, Esq.

3987. The skull of a young Polar Bear (*Ursus maritimus*).

Of the rudimental premolars the sockets of *p* 1 and *p* 3 are present on both sides of the upper jaw; those of *p* 1 and *p* 2 are present on the left side of the lower jaw, but the socket of *p* 1 only remains on the right side.

Presented by Sir William Blizard, F.R.S.

3988. The cranium, in three transverse sections, of a Polar Bear (*Ursus maritimus*).

The hindmost has been made through the middle of the mastoid process, and includes the epencephalic division of the cranial cavity, with part of the acoustic cavities. It well exhibits the cerebellar fossæ, formed by the bony tentorium above, and by a shorter osseous ridge below separating the cerebellum from the upper part of the medulla oblongata. The commencement of the entocarotid canal may be seen distinct from the fore part of the fossa jugularis, and the division of the petrosal fossa into two cells for the reception of the cerebellar

appendages. The mastoid is occupied by a close diploë, which receives no air-cells from the tympanic cavity. In the middle section may be seen the oblique termination of the meatus auditorius within the tympanic cavity. The anterior section shows the triangular constriction which separates the prosencephalic from the rhinencephalic chamber, the latter of which is laid open, together with the olfactory chambers, by an extensive fracture of the upper part of the skull. The lateral walls of the cranium are extremely thin where they give attachment to the temporal muscles.

In all the foregoing specimens of the *Ursus maritimus* the median prepalatine foramen is well marked, but is largest in No. 3980. The cranial peculiarities of the *Ursus maritimus* are constant throughout this series of skulls, and give confidence in those that characterize the other species of Bear. The differences which result from age are well seen in the comparison of the old skulls with that of the young Polar Bear belonging to the skeleton No. 3979. But in this, as in the other skulls, may be seen the comparatively straight contour of the upper surface, the extension of the long nasal bones behind the extremities of the nasal processes of the maxillaries, and the narrowness and depth of the posterior palatine fissure.

Hunterian.

The following, to No. 4011 inclusive, are parts of the same skeleton of the Polar Bear (*Ursus maritimus*).

Hunterian.

3989. The lower jaw.

3990. The atlas.

3991. The dentata.

3992. The five other cervical vertebræ.

3993. Four dorsal vertebræ.

3994. Six lumbar vertebræ.

3995. The pelvis.

3996. The right scapula.

3997. The right humerus.

3998. The right radius.

3999. The right scapho-lunar bone of the carpus.

4000. The left scapho-lunar bone.

4001. The right femur.

4002. The right tibia.

4003. The right fibula.

4004. The right patella.

4005. The right astragalus.

4006. The left astragalus.

4007. The right calcaneum.

4008. The left calcaneum.

4009. The left radius, longitudinally bisected.

The medullary cavity terminates a little way below the middle of the bone.

4010. The left femur, longitudinally bisected.

The medullary cavity is confined to the middle third of the bone. The medullary artery, which enters at the posterior and inner side, below the middle of the shaft, takes an oblique course upwards of two inches before it opens into the medullary cavity: a bristle has been passed through the canal.

4011. The left fibula, longitudinally bisected.

The medullary cavity extends through nearly the whole of the shaft of this slender bone.

4012. The os penis of a Polar Bear (*Ursus maritimus*).

Presented by Captain Ross, R.N.

4013. The skeleton of the American Black Bear (*Ursus americanus*).

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 13 sacral; the caudal series is incomplete. Nine pairs of ribs articulate directly with the sternum, which consists of eight bones, besides the xiphoid appendage. The scapula is remarkable for its almost quadrate form, and for the strong development of the ridge between the infraspinatus and teres major, constituting almost a second spine. The inner condyle of the humerus is not perforated. The scaphoid and lunar bones of the carpus have coalesced into a single bone, as in most other Carnivora. The femur is almost straight, and long in proportion to the tibia: the fifth digit exceeds the second in length in both fore and hind feet. The first digit in both fore and hind feet has but two phalanges, as in other mammalian quadrupeds.

Mus. Brookes.

4014. The skull of a small, and probably female, American Black Bear (*Ursus americanus*).

In the interspace between the canine and last premolar there are three sockets on the right side of the upper jaw, and two on the left side, the middle one (*p* 2) being obliterated; only the first small socket of *p* 1 is preserved in the same interspace of the lower jaw.

Presented by the Lords of the Admiralty.

4015. A similar-sized skull of the American Black Bear (*Ursus americanus*).

The symphysis of the lower jaw has been ulcerated, and the incisors lost. There are three sockets for *p* 1, *p* 2, and *p* 3, between the canine and last premolar, *p* 4, on each side of the upper jaw, and two sockets for the first and third premolars in the same interspace of the

lower jaw. The teeth of the left side of the upper jaw, and some of those on the left side of the lower jaw, are separately displayed, and are indicated by their symbols.

Hunterian.

4016. The skull of a young Grizzly Bear (*Ursus ferox*).

This had acquired the mature dentition. It corresponds in age with the skull of the European Brown Bear (No. 4046), but differs in the greater breadth of the occiput, the larger size of the condyles, and the more prominent and swollen inferior border of the foramen magnum, which connects together the lower extremities of the condyles and projects below the level of the expanded part of the basioccipital. The posterior border of the bony palate is excavated by a deeper and more angular notch. The frontal region is less elevated, and less convex transversely: the nasal processes of the maxillaries extend backwards beyond the point of the nasals. The fourth premolars of the upper jaw are relatively larger and more tuberculate posteriorly. The interspace between the canine and last premolar is relatively longer; it contains the alveoli of *p* 1 and *p* 3 on both sides: the alveoli of the rudimentary premolars are obliterated in the lower jaw. The facial part of the skull is relatively longer than in the *Ursus arctos*, and the nasal processes of the premaxillaries are much longer, are more slender, and articulate directly with the anterior processes of the frontals. In the specimen of the young Brown Bear (No. 4046), the maxillaries articulate with the small part of the nasals and separate the premaxillaries from the frontals. The calvarium, which is separated from the rest of the skull, shows the strong bony tentorium and the large olfactory fossæ.

Presented by the Zoological Society of London.

The following, to No. 4036 inclusive, are parts of the same *Ursus ferox*:—

Presented by the Zoological Society of London.

4017. The atlas.

4018. The dentata.

4019. The fifth cervical vertebra.

4020. A dorsal vertebra.

4021. A lumbar vertebra.

4022. The first thoracic rib.

4023. A posterior thoracic rib.

4024. The right scapula.

4025. The left scapula.

4026. The right humerus.

4027. The left ulna.

4028. The right radius.

4029. The left radius.

4030. The right os innominatum.

4031. The left os innominatum.

4032. The right femur.

4033. The right tibia.

4034. The left tibia.

4035. The left patella.

4036. The left fibula.

4037. The skeleton of a female Long-lipped Bear (*Ursus labiatus*).

This has the same number of true vertebræ (27) as the *Ursus americanus* (No. 4013), but free ribs are articulated to fifteen of these, leaving five ribless or lumbar vertebræ: the number of anchylosed or sacral vertebræ is 5; that of the caudal vertebræ, 10. The met- and an-apophyses are distinct on the twelfth dorsal, diverge and increase on the succeeding dorsals, the metapophyses continuing throughout the lumbar series; the anapophyses, after underlapping the prozygapophyses of the first and second lumbar, rapidly subsiding. The first and second incisors (*i* 1 & *i* 2) are lost, and the socket of *i* 1 is obliterated, in the upper jaw.

Purchased.

4038. The skull of a male Long-lipped Bear (*Ursus labiatus*).

The frontal region is more elevated than in the male *Ursus brevirostris* (No. 4044), and the facial portion of the skull is longer, but the chief difference is seen in the much smaller proportion of the molar teeth, and the complete obliteration of the sockets of the first upper incisors (*i* 1). The bony palate is also broader and flatter, and terminates in an almost straight line posteriorly. In the interspace between the canine and last premolar (*p* 4) there are three sockets in both the upper and lower jaws: the third (*p* 3) in the upper jaw, and the second (*p* 2) and third (*p* 3) in the lower jaw, indicate the division of the fang in those rudimental premolar teeth *.

Presented by Sir Everard Home, Bart., V.P.R.S.

4039. The skull of a female Long-lipped Bear (*Ursus labiatus*).

It is much smaller than that of the male, and the frontal region is not elevated, but it shows the same diminutive proportions of the molar teeth, and the same proportions of the premolars, the third of which has two fangs in both the upper and lower jaw. The sockets of the first upper incisors (*i* 1) are equally obliterated in this skull, and the bony palate has the same relative breadth and configuration of its posterior margin.

Mus. Brookes.

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* This specimen is referred to by Cuvier (Ossemens Fossiles, 4to, tom. iv. p. 334) in the following words:—"La tête du Muséum des Chirurgiens donnée pour celle de l'ours qui avait été pris pour un *paresseux* (*U. labiatus*) me paroît différer de celle de Java. Outre le plus grand espace entre les canines et la série continue des molaires, on voit que c'est surtout entre les apophyses orbitaires que le front y est bombé, et que la ligne de profil devient concave à la racine du nez."

4040. The skull of a female Long-lipped Bear (*Ursus labiatus*).

The long and narrow nasal bones extend further back than the nasal processes of the maxillaries. The left premaxillary has not quite reached the frontal. There is no prominent ridge continued from between the lower extremities of the occipital condyles. The posterior margin of the bony palate has the same characteristic form as in the preceding specimens. The normal number of premolars has been retained in both jaws, and rudiments of the sockets of the first upper incisors may be seen. The teeth of the right side of both upper and lower jaws are separately displayed, and indicated by their symbols.

Purchased.

4041. The hyoidean arch and appendages of the same Bear (*Ursus labiatus*).

The different elements are numbered according to the TABLE OF SYNONYMS.

Purchased.

4042. Claws of the *Ursus labiatus*. *Hunterian.*

4043. Claws of the *Ursus labiatus*. *Hunterian.*

4044. The skull of an old Indian Black Bear (*Ursus brevirostris*).

It resembles some of the varieties of the European Bear in the elevation and convexity of the frontal region of the skull, but differs in the shorter relative proportion of the facial part anterior to the orbits, and in the smaller relative size of the molar teeth. In the interval between the canine and last premolar (*p* 4), in the right side of the upper jaw, there are the sockets of the three small premolars; on the left side of the same jaw those of the first (*p* 1) and third (*p* 3) are present, but that of the second (*p* 2) is obliterated: in the same interspace on the right side of the lower jaw there are two small premolars, but only one on the left side of the same jaw.

The animal from which this skull was taken was shot on the Gogan range in Kumaon, India.

Purchased.

4045. A skull of the female of the same species of Black Bear (*Ursus brevirostris*).

It is of smaller size than the male, and the frontal region is less elevated. The sockets of the three small premolars remain in the interspace between the last premolar and canine on both sides of the upper jaw, and on the left side of the lower jaw; on the right side of the lower jaw the second of these sockets is obliterated. The strong ligaments which circumscribe the orbits posteriorly have been preserved in this skull. Both the paroccipital and mastoid processes are well-developed in both skulls.

From the Gogan range in Kumaon, India.

Purchased.

4046. The skull of a young male Brown Bear (*Ursus arctos*).

The space between the last premolar and the canines is very short, especially in the upper jaw, and shows the sockets of only two rudimental premolars in both the upper and lower jaws. Although the mature dentition is in place, the elements of the occipital bone have not coalesced: the interparietal is represented by a triangular process of the superoccipital: the alisphenoid articulates with the parietal.

Presented by Samuel Stutchbury, Esq.

4047. The skull of a small Brown Bear (*Ursus arctos*).

It is from an older individual than the preceding, and apparently from a female, being little superior in size; but the comparatively smaller proportions of the molar to the canine teeth indicate a difference of sex. In the interspace between the last premolar and canines of the upper jaw there are two rudimental premolars on both sides; in the same interspace of the lower jaw there is one premolar (p 1) close to the canine, and behind this, on the right side, a very minute second premolar. The frontal region of the skull is elevated and very convex.

Mus. Brookes.

4048. The bones of the left fore foot of a Bear, artificially articulated with each other and with the distal epiphysis of the radius. *Hunterian.*

4049. The bones of the right hind foot of the same Bear, artificially articulated.

Hunterian.

4050. The claws of the fore foot of a Bear. *Presented by Samuel Stutchbury, Esq.*

Family *Procyonidæ* (Racoons and Coatis).

Genus *Procyon*.

Dental formula:—$i\,\frac{3-3}{3-3},\ c\,\frac{1-1}{1-1},\ p\,\frac{4-4}{4-4},\ m\,\frac{2-2}{2-2}=40.$

4051. The skeleton of the Racoon (*Procyon Lotor*).

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 3 sacral; there are 16 caudal, but the series is incomplete. The last four dorsal and all but the last lumbar vertebræ have anapophyses. There is no trace of clavicles. The inner condyle of the humerus is perforated. One of the femora has been fractured and united, and is shorter and thicker than the other. The fibula is characterized by three processes behind its distal end: the malleolar process is very short, but plays upon a well-marked articular surface of the astragalus.

Hunterian.

4052. The skeleton of a Racoon (*Procyon Lotor*).

The vertebral formula corresponds with that in the preceding specimen; but, all the caudal vertebræ being here preserved, they are 18 in number. A few of the anterior ones have hæmapophyses. The fabella is preserved behind the condyle of each femur.

Mus. South.

The following, to No. 4056 inclusive, are parts of the same skeleton of a Racoon (*Procyon Lotor*):—

Hunterian.

4053. The skull.

The entocarotid pierces the inner border of the tympanic bulla: there are no ectocarotid canals. The mastoid is thicker than the paroccipital.

4054. The articulated bones of the trunk and pelvic arch.

The vertebræ are:—7 cervical, 14 dorsal, 6 lumbar, 3 sacral: the caudal series is not complete. Nine pairs of ribs articulate directly with the sternum. The costal parts of the transverse processes of the seventh cervical vertebra not being present, those processes are not perforated by the vertebral arteries. The spinous processes of the trunk-vertebræ converge to the twelfth dorsal vertebra, as the centre of motion in the back. Metapophyses begin to be developed as tuberosities upon the diapophysis of the anterior dorsal vertebræ, increase, and pass upon the zygapophyses in the twelfth dorsal, and are so continued to the end of the lumbar series. The anapophysis separates from the metapophysis on the eleventh dorsal vertebra, increases in length to the third lumbar, and decreases in the other three. The diapophyses subside in the last three dorsal vertebræ.

4055. The articulated bones of the left anterior extremity.

The supra- and infra-spinal fossæ are of equal depth. The internal condyle of the humerus is perforated: the scaphoid and lunar bones have coalesced.

4056. The articulated bones of the left posterior extremity.

4057. The skull of a Racoon (*Procyon Lotor*). *Hunterian.*

4058. The os penis of a Racoon (*Procyon Lotor*). *Hunterian.*

4059. The os penis of a Racoon. *Mus. Brit.*

4060. The os penis of a Racoon. *Hunterian.*

4061. The os penis of a Racoon. *Hunterian.*

4062. The os penis of a Racoon. *Mus. Brit.*

4063. The os penis of a Racoon. *Hunterian.*

Genus *Nasua.*

Dental formula :—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{4-4}{4-4}$, $m\,\frac{2-2}{2-2}=40$.

4064. The skeleton of the Brown Coati-mondi (*Nasua fusca*).

The vertebral formula is :—7 cervical, 13 dorsal, 6 lumbar, 2 sacral; there are 19 caudal, but the series is not complete. The first caudal in other specimens is sometimes anchylosed, and forms a third sacral vertebra. The last cervical vertebra is not perforated by the vertebral artery. There is no trace of clavicles. The inner condyle of the humerus is perforated.

Hunterian.

4065. The skeleton of a Coati-mondi (*Nasua socialis*, Pr. Max.).

The vertebral formula is :—7 cervical, 13 dorsal, 7 lumbar, 3 sacral; there are 22 caudal, but the series appears to be not quite complete.

Mus. South.

4066. The skull of the Brown Coati-mondi (*Nasua fusca*).

The teeth have been removed, and are separately displayed from the left side of the upper and lower jaws.

Hunterian.

4067. The skull of the Red Coati-mondi (*Nasua rufa*).

It is of an old individual, and most of the sutures are obliterated; the zygomatic arches are more slender, and the malar portion is devoid of an orbitar process.

Purchased.

4068. The right moiety of a vertically bisected skull of the Brown Coati (*Nasua fusca*).

It shows the same strength of the zygomatic arch and development of the orbitar process of the malar bone as in the skeleton. The bony tentorium terminates upon the petrosal above the shallow depression of the cerebellar appendage. The upper cranial parietes are moderately thick and with a diploë. The olfactory chamber, with the superior turbinals, extends above the whole rhinencephalic fossa, and forms in part the frontal elevation of the cranial contour.

Presented by Prof. Owen, F.R.S.

4069. Some of the bones of the skull of a young Coati-mondi (*Nasua*).

The deciduous canines, and the four deciduous molar teeth, are retained. The two parietal bones show the development of the bony tentorium upon their posterior margin. In the right upper maxillary bone the first true molar is just appearing behind the last deciduous molar, and the germs of the fourth, third and second premolars are displayed above the teeth which they would have displaced. In the right ramus of the lower jaw, the germs of the third and fourth premolars and that of the permanent canine are exposed.

The animal from which these bones were derived was called by Mr. Hunter the "Swash."

Hunterian.

The following, to No. 4079 inclusive, are parts of the same skeleton of the Coati-mondi (*Nasua*).

Hunterian.

4070. The atlas and dentata.

4071. The sixth cervical vertebra.

4072. A lumbar vertebra.

4073. The right scapula.

4074. The right humerus.

4075. The right ulna.

4076. The right radius.

4077. The pelvis.

4078. The left femur.

4079. The left tibia and fibula, anchylosed.

4080. The bones of the left fore foot of a Coati (*Nasua*).

They are naturally articulated together, with the distal epiphyses of the radius and ulna. The scaphoid and lunare form one bone. There is a supplementary ossicle wedged between this bone and the metacarpal of the pollex, external to the trapezium.

Presented by Prof. Owen, F.R.S.

4081. The bones of the left hind foot, naturally articulated, of a Coati (*Nasua*).

They show a corresponding supplemental ossicle wedged between the scaphoid and ento-cuneiform.

Presented by Prof. Owen, F.R.S.

4082. The left humerus, longitudinally bisected. *Presented by Prof. Owen, F.R.S.*

4083. The right femur, longitudinally bisected. *Presented by Prof. Owen, F.R.S.*

4084. A right tibia, longitudinally bisected. *Presented by Prof. Owen, F.R.S.*

Genus *Cercoleptes.*

Dental formula :—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{3-3}{3-3}$, $m\,\frac{2-2}{2-2}=36$.

4085. The skeleton of the Kinkajou (*Cercoleptes caudivolvulus*).

The number of vertebræ is :—7 cervical, 14 dorsal, 6 lumbar, 2 sacral, and 31 caudal. The first caudal becomes anchylosed with the sacrum in old individuals. The anapophyses begin to be developed on the tenth dorsal, and continue to be developed to the penultimate lumbar. Some of the caudal vertebræ have hæmapophyses. The inner condyle of the humerus is notched in the right and perforated in the left bone. The upper costa passes by a regular curve into the base of the scapula. There is no trace of clavicles. The skull is characterized by the extreme shortness of its facial part.

Mus. Brookes.

4086. The skull of a Kinkajou (*Cercoleptes caudivolvulus*).

It well illustrates the dental formula above given. The premolars are *p* 2, *p* 3, and *p* 4 ; the true molars, *m* 1 and *m* 2 ; the canines are peculiar, on account of the longitudinal ridge upon the outer side of the crown : the upper ones have a ridge on the inner side. By the shortness of the facial part of the skull, it resembles that of the Cat, but differs in the greater posterior expanse of the cerebral cavity, in the minor development of the tympanic bullæ, the weaker and less expanded zygomatic arches, the smaller orbits and larger antorbital foramina, and by the greater depth of the rami of the lower jaw.

Hunterian.

4087. The atlas of the Kinkajou (*Cercoleptes caudivolvulus*). *Hunterian.*

4088. The axis and five following cervical vertebræ of the *Cercoleptes caudivolvulus.*
Hunterian.

4089. The right scapula of the *Cercoleptes caudivolvulus.* *Hunterian.*

4090. The left os innominatum of the *Cercoleptes caudivolvulus.* *Hunterian.*

Family *Melidæ.*

Genus *Meles.*

Dental formula :—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{4-4}{4-4}$, $m\,\frac{1-1}{2-2}=38$.

4091. The skeleton of the common Badger (*Meles Taxus*).

The vertebral formula is :—7 cervical, 15 dorsal, 5 lumbar, 3 sacral, and 18 caudal. Nine pairs of ribs articulate directly with the sternum, which is composed of eight bones and a

xiphoid appendage. There is no trace of clavicles. The scapula presents a subquadrate form, crossed diagonally by the spine, and with one angle produced to form the glenoid cavity: the coracoid is represented by a low tubercle. There is no inferior ridge or spine, and no trace of clavicle. The inner condyle of the humerus is perforated. The scaphoid and lunar bones are connate in the carpus.

Hunterian.

4092. The skeleton of the Badger (*Meles Taxus*).

The vertebral formula agrees with that of the foregoing skeleton, save in the loss of a caudal vertebra. Anapophyses are developed in the first three lumbar vertebræ.

Presented by William Home Clift, Esq.

4093. The skull of the Badger (*Meles Taxus*).

It is chiefly remarkable for the closeness with which the transverse condyles of the lower jaw are grasped by the borders of the articular grooves at the base of the zygomatic processes, so that the mandible cannot be disarticulated without some violence.

Presented by Sir R. W. Vaughan.

4094. The skull, vertically and longitudinally bisected, of the Badger (*Meles Taxus*).

It shows the complete permanent dentition; the rudimental anterior premolar, *p* 1, being preserved in both jaws; and exemplifying the dental formula as given above.

In the left moiety of the cranium bristles are passed through the carotid canal, through the lateral sinus which terminates behind the glenoid cavity, and through the subpetrosal sinus, which terminates at the entocondyloid foramen.

Hunterian.

4095. The skull of the Badger (*Meles Taxus*). *Presented by Henry Cline, Esq.*

4096. The skull of the Badger (*Meles Taxus*). *Presented by Henry Cline, Esq.*

The following, to No. 4110 inclusive, are parts of the same skeleton of the *Meles Taxus*:—

Mus. South.

4097. The skull of an old Badger (*Meles Taxus*).

The fore part of the jaws is diseased, and the calvarium removed. There is no middle prepalatine foramen, as in the Bears.

4098. The atlas.

4099. The dentata.

4100. The fourth lumbar vertebra.

4101. The sacrum.

4102. The left scapula.

4103. The right humerus.

4104. The right ulna.

4105. The left radius.

4106. The right ilium.

4107. The left ilium.

4108. The right femur.

4109. The right tibia.

4110. The left fibula.

Family *Mustelidæ*.

Genus *Mydaus*.

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{3-3}{3-3}$, $m\,\frac{1-1}{2-2}=34$.

4111. The skeleton of the Javanese Skunk (*Mydaus meliceps*).

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 3 sacral; there are 9 caudal, but the series is not complete. The last two dorsal and the first lumbar vertebræ have anapophyses. The meatus auditorius is directed obliquely outwards and forwards. There are no clavicles. In the scapula there is only a trace of the coracoid tubercle. The inner condyle of the humerus is perforated. The femur is shorter than the tibia: the carpus and tarsus resemble those of the Badger. The length and slenderness of the muzzle, and the weakness of the zygomatic arches, indicate an approach to the Insectivora. The first small premolar, *p* 1, is wanting in both jaws. The upper true molar, *m* 1, has a broad quadrate and quadrituberculate crown. In the lower jaw the omnivorous character is manifested by the assumption of a tubercular crown and the almost total loss of the sectorial form in the first true molar, which supports six small tubercles.

Hunterian.

Genus *Ratelus*.

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{3-3}{3-3}$, $m\,\frac{1-1}{1-1}=32$.

4112. The skeleton of a Ratel (*Ratelus mellivorus*).

The vertebral formula is:—7 cervical, 14 dorsal, 4 lumbar, 4 sacral, 15 caudal. The transverse processes of the atlas are perforated lengthwise and vertically, and the neurapophysis is perforated close to the vertical foramen. The spine of the dentata is much produced forwards, and, in a less degree, backwards. Metapophyses are developed from the second to the sixth cervical inclusive; they are situated above the posterior zygapophyses: the costal

parts of the transverse processes of these vertebræ overlap each other, and, in the sixth, form hatchet-shaped plates. The metapophyses appear above the diapophyses in the second dorsal, and so continue to the ninth dorsal: in the eleventh they rise upon the prozygapophyses, and in the twelfth become distinct from the anapophyses. These are well developed in the lumbar vertebræ, and underlap the prozygapophyses of the vertebra behind. The vertebra reckoned in the above formula as the first sacral has the characters of a lumbar vertebra on its left side. There appear to have been no hæmapophyses in the caudal vertebræ, but hypapophyses are developed in pairs, from the under part of the sixth and succeeding caudals. Nine pairs of ribs directly join the sternum, which consists of eight bones. There are no clavicles. The scapula is subquadrate, crossed obliquely by the spine, with the supraspinal fossa larger than the infraspinal one. The coracoid is sub-bifid, the acromial tubercle slightly produced. Both humeri are perforated between the condyles, and the right one is perforated above the inner condyle. There is a surface for a fabella above each condyle of the femur.

Presented by William Crozier, Esq., Surgeon H.E.I.C.

4113. The skull of an old male Ratel (*Ratelus mellivorus*).

All the sutures are obliterated. This skull resembles in form that of the Badger, but differs in the greater breadth of the occipital region, the larger and more convex tympanic bullæ, the smaller antorbital foramina, the less close articulation of the lower jaw and its deeper ascending ramus; in all these particulars it resembles the skull of the Polecat.

Presented by Colonel Everest.

The following, to No. 4131 inclusive, are parts of the same skeleton of a female Ratel (*Ratelus mellivorus*):—

Hunterian.

4114. The skull.

The entocarotids pierce the inner border of the tympanic bullæ. The transversely extended base of the paroccipital is applied to the back part of the bulla.

4115. The atlas.

The anterior articular surfaces are continued below into each other, corresponding with a similar continuation of that surface between the lower borders of the occipital condyles, whereby the atlas articulates directly with the basioccipital. The vertebral artery perforates the base of the diapophysis horizontally and vertically in two places, and then perforates the upper part of the neural arch. The hinder articular surfaces of the atlas unite, like those in front, to form one continuous surface.

4116. The dentata.

The two anterior articular surfaces are continued into each other beneath the odontoid. The spine is lofty and much extended, both forwards and backwards.

4117. The five remaining cervical vertebræ.

The neural arches are longer than the centrums and overlap each other in an imbricated manner, giving great strength to the articulations of this part of the vertebral column. The transverse processes of the seventh cervical are not perforated.

4118. A dorsal vertebra.

4119. A posterior dorsal vertebra.

4120. A series of five lumbar vertebræ.

The metapophyses surmount the prozygapophyses in each, and anapophyses are developed from all but the last lumbar.

4121. The sacrum.

It consists of four anchylosed vertebræ.

4122. The right scapula.

It is of a subquadrate form, crossed diagonally by the spine, with a distinct coracoid tubercle.

4123. The right humerus.

It shows the great extent of the deltoid ridge and the perforation of the internal condyle.

4124. The right ulna.

4125. The right radius.

4126. The right os innominatum.

4127. The right femur.

4128. The right tibia and fibula.

4129. The right calcaneum.

It presents two distinct surfaces for the astragalus, the inner one concave, the outer one convex, and an anterior cavity for the cuboid.

4130. The left femur longitudinally bisected.

4131. The left tibia longitudinally bisected.

There is no medullary cavity. A moderately coarse diploë fills up the whole interior of the bone. The compact walls are rather thicker than usual.

Genus *Taira.*

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{3-3}{3-3}$, $m\,\frac{1-1}{2-2}$, $=34$.

4132. The skull of the Taira (*Taira barbara*).

The first premolars (p 1) are wanting in both jaws, as in the Ratel, from which the dentition differs in the presence of a second true molar on each side of the lower jaw. The form of the skull closely resembles that of the Ratel; but the zygomatic arches are weaker, and the bony palate is longer, narrower, and more produced behind the teeth.

Purchased.

Genus *Gulo.*

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{4-4}{4-4}$, $m\,\frac{1-1}{2-2}$, $=38$.

The following, to No. 4148 inclusive, are parts of the skeleton of a Wolverine (*Gulo luscus*):—

Hunterian.

4133. The skull.

The cranial cavity is less expanded posteriorly, and less constricted anteriorly, than in the Ratel. There is a smooth articular surface in the basioccipital, but it is less distinctly continuous with the occipital condyles than in the Ratel. The zygomatic arches are larger, stronger, and more curved: the palate is relatively broader: both the paroccipital and the mastoid processes are feebly developed.

4134. The atlas.

It resembles that of the Ratel, but is not so strong a bone, and the articular surfaces are not continued into each other.

4135. The axis.

4136. An anterior dorsal vertebra.

4137. A lumbar vertebra.

The metapophyses appear as tubercles above the prozygapophyses: the anapophyses are nore developed.

4138. The last lumbar vertebra.

The anapophyses are suppressed.

4139. The sacrum.

It consists of three anchylosed vertebræ.

4140. A thoracic rib.

4141. The left scapula.

It is of a trapezoidal form, equally and obliquely bisected by the spine, which developes a bifid acromion: there is a distinct coracoid tubercle.

4142. The right humerus.

The inner condyle is perforated. The deltoid ridge terminates on the middle of the shaft. The medullary artery enters on the inner side, at the lower third of the bone, and extends obliquely downwards.

4143. The left radius.

The medullary artery enters at the back part of the bone, one-fourth from the proximal end, and the canal ascends obliquely.

4144. The left ulna.

4145. The right femur.

The medullary artery enters at the back part, above the middle of the shaft: the canal ascends obliquely.

4146. The right tibia.

The medullary artery enters one-third from the proximal end, and descends obliquely.

4147. The fibula.

4148. The right os innominatum.

4149. The skull of a Wolverine (*Gulo luscus*).

Presented by the Lords of the Admiralty.

4150. The skull of a Wolverine (*Gulo luscus*). *Presented by Henry Cline, Esq.*

4151. The cranium of a large old Wolverine (*Gulo luscus*).

All the sutures are obliterated.
From Melville Island.

Presented by the Lords of the Admiralty.

Genus *Mustela*.

Dental formula:—$i\ \frac{3-3}{3-3}$, $c\ \frac{1-1}{1-1}$, $p\ \frac{4-4}{4-4}$, $m\ \frac{1-1}{2-2}=38$.

4152. The skeleton of a Pine Marten (*Mustela Martes*).

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 3 sacral; the caudal series is incomplete. Most of the epiphyses are still ununited. The deciduous canines are retained in the upper jaw, behind the crowns of the permanent ones, which are protruded to the same extent. All the true molar teeth are acquired.

Hunterian.

4153. The skull of a Pine Marten (*Mustela Martes*).

Presented by Henry Cline, Esq.

4154. The skull of a Pine Marten (*Mustela Martes*).

As compared with the Wolverine, the cranium and orbits are relatively larger, the tympanic bullæ are more expanded, the bony palate is longer and narrower, and the zygomatic arches much weaker. The paroccipitals and mastoids are almost obsolete in this skull.

The following are parts of the skeleton of a Marten (*Mustela Martes*):—

Hunterian.

4155. The atlas.

4156. The axis.

4157. An anterior dorsal vertebra.

4158. A lumbar vertebra.

The metapophyses appear as tubercles above the prozygapophyses: the anapophyses are more distinctly developed.

4159. The sacrum.

It consists of two anchylosed vertebræ.

4160. The right scapula.

It shows the great breadth of the supraspinal portion, the upper border of which is rounded. The acromion is bifid: the coracoid is incurved.

4161. The right humerus.

The inner condyle is perforated.

4162. The right radius.

4163. The right ulna.

4164. The right os innominatum.

4165. The right femur.

4166. The right tibia.

All the long bones of the Marten are more slender than in the Wolverine.

4167. The skull of the Yellow-throated Marten (*Mustela flavigula*).

Presented by Colonel Finch.

4168. The skeleton of a Sable (*Mustela zibellina*).

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 3 sacral, and 18 caudal. The eleventh dorsal vertebra is that towards which the spines of the other trunk-vertebræ converge. The anapophyses begin to be developed upon the ninth dorsal, and are continued to the penultimate lumbar vertebra. The transverse processes of the seventh cervical are not perforated. Ten pairs of ribs directly join the sternum, which consists of nine bones, with a xiphoid cartilage. The supraspinal plate of the scapula is deeper or broader than the lower one, and its border is very convex: the inner condyle of the humerus is perforated: the os penis is preserved in this skeleton.

Hunterian.

4169. The skull of the Sable (*Mustela zibellina*).

It differs little from that of the Marten, except in its superior size, somewhat stronger and more arched zygomata, and better-developed parietal and occipital cristæ.

Presented by Sir John Richardson, M.D., F.R.S.

4170. The skull of a younger or female Sable (*Mustela zibellina*).

The nasal sutures still remain, but the temporal ridges have not quite met upon the upper surface of the cranium.

Presented by Sir John Richardson, M.D., F.R.S.

4171. The skull of the Beech Marten (*Mustela foina*).

The teeth have been removed from the right side of both upper and lower jaws, and are separately displayed. The fore part of the skull is injured, probably by the blow which killed the animal. No character of specific distinction is discernible between this and the preceding specimens of the skull of the Sable.

Hunterian.

Genus *Zorilla*.

Dental formula:—$i\,\frac{3-3}{3-3},\ c\,\frac{1-1}{1-1},\ p\,\frac{3-3}{3-3},\ m\,\frac{1-1}{2-2}=34.$

4172. The skull of the Cape Polecat (*Zorilla capensis*).

As compared with the European Polecat, the cranial cavity is larger, the premaxillary bones more prominent, the zygomatic arch more slender, and the antorbital foramen smaller.

From the Cape of Good Hope.

Purchased.

The following, to No. 4187 inclusive, are parts of the same skeleton of the *Zorilla capensis*:—

Purchased.

4173. The atlas.

4174. The dentata.

4175. The third, fourth and fifth cervical vertebræ.

4176. The sixth and seventh cervical and the first dorsal vertebræ.

4177. Two anterior dorsal vertebræ.

4178. Four posterior dorsal and three anterior lumbar vertebræ.

4179. A middle lumbar vertebra.

4180. Two posterior lumbar vertebræ, the sacrum, and three anterior caudal vertebræ.

4181. The remaining caudal vertebræ.

The hæmapophyses are preserved on five of the anterior ones.

4182. The sternum and cartilages of the ribs.

Ten pairs of ribs directly unite with the sternum, which consists of ten bones, with the xiphoid cartilage.

4183. The two scapulæ.

The bone is extremely thin, and is perforated at the corresponding parts of both upper and lower costæ in both specimens.

4184. The two humeri.

They are perforated between the condyles and above the inner condyle.

4185. The bones of the fore leg and most of those of the fore foot.

4186. The two ossa innominata.

4187. The bones of the hinder extremity, naturally connected together.

There are two fabellæ behind the outer condyle, and a sesamoid behind the entocuneiform: the inner digit and some of the phalanges are wanting in both feet.

Genus *Putorius*.

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{3-3}{3-3}$, $m\,\frac{1-1}{2-2}=34$.

4188. The natural skeleton of a male Ermine (*Putorius ermineus*).

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 2 sacral, 18 caudal. The spines of the tenth and eleventh dorsal vertebræ converge towards each other and almost meet, indicating the centre of motion of the trunk. Ten pairs of ribs directly join the sternum. The

neck is strengthened by the overlapping of the costal parts of the transverse processes of the third to the sixth cervical vertebræ. Some of the anterior caudal vertebræ have hæmapophyses. The inner condyle of the humerus is perforated.

Purchased.

4189. The skeleton of a female Ermine (*Putorius ermineus*).

Its proportions are smaller and more slender than those of the male: the vertebral formula is the same.

Mus. South.

4190. The skull of an Ermine (*Putorius ermineus*).

The meatus auditorius is an oblique perforation in the lateral and inferior parietes of the skull, directed from within outwards and forwards, and not produced upon an auditory process. The bulla tympanica is very extensive.

Hunterian.

4191. The skull of an Ermine (*Putorius ermineus*).

Presented by Henry Cline, Esq.

4192. The skull of an Ermine.

The teeth of one side of both jaws have been removed, and are separately displayed.

Hunterian.

4193. The skeleton of the common Weasel (*Putorius vulgaris*).

The vertebral formula and other characters correspond with those in the skeleton of the Ermine, but the animal is smaller.

Mus. Brookes.

4194. The skull, wanting the lower jaw, of a Weasel (*Putorius vulgaris*).

Presented by Henry Cline, Esq.

4195. The skull of a Weasel (*Putorius vulgaris*). *Purchased.*

4196. The skeleton of the Alpine Polecat (*Putorius alpinus*).

The temporal fossæ are more marked and the sagittal crest is better developed than in the common Polecat or Weasel, but the number of the vertebræ and the general character of the skeleton closely correspond. The spine of the scapula is emarginate behind the posterior division of the acromion.

Mus. Brit.

4197. The skull of a Polecat (*Putorius Furo*). *Hunterian.*

4198. The skull of a Polecat (*Putorius Furo*). *Mus. Brit.*

4199. The skull of a Polecat (*Putorius Furo*). *Presented by Henry Cline, Esq.*

4200. The skull, vertically and longitudinally bisected, of a Polecat (*Putorius Furo*).

The bony tentorium terminates upon the back part of the petrosal, above the deep circular pit for the cerebellar appendage. The rhinencephalic fossa is less distinctly defined than the rest of the cranial cavity; the olfactory chamber extends backwards both above and beneath that fossa.

Presented by Prof. Owen, F.R.S.

The following, to No. 4213 inclusive, are parts of the same skeleton of a Polecat (*Putorius Furo*):—

Hunterian.

4201. The skull.

4202. The atlas.

The vertebral artery perforates the transverse process horizontally, and notches its anterior border before perforating the neural arch.

4203. The dentata. 4204. A lumbar vertebra. 4205. The sacrum.

4206. The right scapula.

It is remarkable for the great breadth and superior size of the lower division of the acromion. The glenoid articular surface is continued upon the coracoid tubercle.

4207. The right humerus.

The inner condyle is perforated.

4208. The right radius. 4209. The right ulna.

4210. The right os innominatum. 4211. The left femur.

4212. The right tibia. 4213. The right fibula.

4214. The skull of the light-coloured and partly domesticated variety of the Polecat, called 'Ferret' (*Putorius Furo*, var.). *Hunterian.*

4215. The skull of a Ferret (*Putorius Furo*, var.). *Presented by Henry Cline, Esq.*

4216. A vertically and longitudinally bisected cranium of a Ferret (*Putorius Furo*, var.). *Presented by Henry Cline, Esq.*

4217. A transversely bisected cranium of a Ferret (*Putorius Furo*, var.).

In the posterior section the bony tentorium is seen to project rather from the upper than from the posterior wall of the cranium. In the anterior section the olfactory chamber is seen surrounding the rhinencephalic fossa, and causing the cranium to appear dilated at that part: the air must be filtered, as it were, through the complex turbinals before passing into the canal of the posterior nares.

Presented by Prof. Owen, F.R.S.

The following, to No. 4229 inclusive, are parts of the same skeleton of the Ferret (*Putorius Furo*, var.):—

Hunterian.

4218. The skull.

The teeth have been removed from one side of both jaws, and are separately displayed.

4219. The atlas.

4220. The third and fourth cervical vertebræ.

4221. The sacrum.

It consists of three anchylosed vertebræ.

4222. The left scapula.

4223. The left humerus.

4224. The left radius.

4225. The left ulna.

4226. The right os innominatum.

4227. The right femur.

4228. The right tibia.

4229. The right fibula.

4230. The os penis of a Polecat or Ferret. *Mus. Brit.*

4231. The skull of the Mink (*Putorius Lutreola*).

Presented by Henry Cline, Esq.

Genus *Mephitis*.

Dental formula:—$i\,\frac{3-3}{3-3},\ c\,\frac{1-1}{1-1},\ p\,\frac{3-3}{3-3},\ m\,\frac{1-1}{2-2}=34.$

4232. The skull of the American Skunk (*Mephitis americanus*).

The occipital condyles are separated by an interspace below. All the sutures of the skull are obliterated. The tympanic bullæ are very feebly developed.

Presented by Henry Cline, Esq.

Genus *Lutra*.

Dental formula:—$i\,\frac{3-3}{3-3},\ c\,\frac{1-1}{1-1},\ p\,\frac{4-4}{3-3},\ m\,\frac{1-1}{2-2}=36.$

4233. The skeleton of an Otter (*Lutra vulgaris*).

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 3 sacral: there are 23 caudal, but the series is incomplete. Ten pairs of ribs directly join the sternum, which consists of nine bones and an ensiform cartilage. The spine of the eleventh dorsal vertebra is vertical, and those before and behind it converge towards it, as the centre of motion of the trunk. The metapophyses begin to be developed on the twelfth dorsal vertebra, and are continued throughout the lumbar series; they are low and obtuse. The anapophyses commence at the eleventh vertebra, and are continued to the penultimate lumbar. The spines of the three sacral vertebræ have coalesced to form a vertical crista. Hæmapophyses are developed beneath several of the anterior caudal vertebræ; they are articulated, and some of them become anchylosed to short hypapophyses or exogenous processes from the under and fore part of the centrum, and then are continued in several of the succeeding vertebræ, which have not the hæmal arch complete. The neural arch is incomplete beyond the eighth caudal vertebra. The entire tail is longer and much stronger than in the terrestrial *Mustelidæ*: it is the chief organ in regulating the course of the Otter through the water.

Presented by William Yarrell, Esq., F.L.S.

4234. The skeleton of a male Otter (*Lutra vulgaris*).

In this skeleton four vertebræ are anchylosed to form the sacrum, and there are 25 caudal vertebræ, the two terminal ones being here present which are wanting in the preceding skeleton. The formula of the true vertebræ is the same.

Mus. South.

4235. The skull of a male Otter (*Lutra vulgaris*).

The teeth have been removed from the right side of both jaws, and are separately displayed; their nature is indicated by their symbols. The small upper *p* 1 has no homotype in the lower jaw; the double-fanged tooth which opposes and even advances a little beyond it answers to the double-fanged *p* 2 in the upper jaw, and the number of the molar series is rendered the same in both jaws by the additional true molar (*m* 2) in the lower one. This will be clearly understood by comparing the dentition of the Otter with that of the Marten (No. 4153), for example, in which *p* 1 is retained in the lower as well as in the upper jaw.

Hunterian.

4236. The skull of a male Otter (*Lutra vulgaris*).

The calvarium has been removed. A narrow articular surface upon the basioccipital connects together the two condyles. The cranial cavity is remarkable for its great posterior expanse and its extreme contraction between the prosencephalic and rhinencephalic divisions. In this example the temporal ridges commencing from the postorbital processes meet at an open angle, and extend backwards, as a low and straight sagittal crest, as far as the broader occipital crest. The zygomatic arches are strong and boldly curved; they bifurcate anteriorly to surround the large antorbital foramen. The sella turcica is very shallow and but feebly indicated. The tract for the optic chiasma is very long and narrow. The crista galli extends backwards through nearly the whole of the rhinencephalic fossa. The longitudinal sinus has left a deep groove, and communicates behind with two small venous foramina in the superoccipital bone.

Hunterian.

4237. The cranium of a male Otter (*Lutra vulgaris*), in three transverse sections.

In the posterior segment the form and relations of the bony tentorium are well seen: the bony plates are continued into the tentorium from the petrosal ridges. Two small venous foramina in the superoccipital open above the tentorium into the termination of the bed of the longitudinal sinus. The middle and anterior sections show the absence of frontal sinuses, and the commencement of the olfactory chamber directly in front of the rhinencephalic fossa, the cribriform plate, or back part of the olfactory capsule, with the coalesced prefrontals separating them. The entry to the nasal passages is almost blocked up by the large and complex turbinals.

Presented by Prof. Owen, F.R.S.

4238. The right ramus of the lower jaw of the same Otter.

4239. The skull of a female Otter (*Lutra vulgaris*). *Presented by Henry Cline, Esq.*

4240. The skull of a female Otter (*Lutra vulgaris*). *Hunterian.*

4241. A vertically and longitudinally bisected skull of an old female Otter (*Lutra vulgaris*).

The sutures are obliterated. The cranium is shorter, especially at the rhinencephalic part, than in the male. The surface of the cranium to which the temporal muscles are attached is rugged. The bony tentorium terminates upon the petrosal above the small pit for the cerebellar appendage. The cranial walls are thin, without diploë. The impressions of the convolutions are strongly marked.

Presented by Henry Cline, Esq.

The following, to No. 4262 inclusive, are parts of the same skeleton of the Otter (*Lutra vulgaris*) :—

Hunterian.

4242. The skull.

4243. The atlas.

The anterior articular cavities are completely disunited. The vertebral artery perforates the transverse process horizontally, and slightly grooves it anteriorly as it ascends to perforate the neural arch.

4244. The dentata.

A tubercle is developed above each of the posterior zygapophyses.

4245. The fourth cervical vertebra.

The tubercle upon the posterior zygapophysis is developed into a ridge.

4246. An anterior dorsal vertebra.

4247. A lumbar vertebra.

4248. The two anterior or normal sacral vertebræ.

The spinous processes are better developed than in any of the other *Mustelidæ*.

4249. An anterior caudal vertebra.

4250. The first thoracic rib.

4251. The fifth thoracic rib.

4252. The right scapula.

In it may be noticed the greater expanse of the supraspinal portion and the well-marked division of the acromion, the broader and posterior portion bending down, and the narrow and anterior portion extending forwards: the coracoid tubercle is rudimentary.

4253. The right humerus.

It is remarkable for the compression of the shaft, which is strongly bent forwards, and for the continuation of a ridge from the deltoid as far as the distal condyle. The inner condyle is perforated.

4254. The right radius.

4255. The right ulna.

4256. The two ossa innominata.

4257. The right femur.

It shows the articular depression above and behind the outer condyle for the fabella, which is preserved in both skeletons.

4258. The right tibia.

4259. The right fibula.

4260. The astragalus.

4261. The calcaneum.

4262. The patella.

4263. The skull, with some of the separated bones, of an Otter (*Lutra vulgaris*).

The right cerebellar fossa is exposed by the removal of part of the tentorium, and the left acoustic bulla is opened to show the horizontal position of the tympanum.

Hunterian.

Family *Viverridæ.*

Genus *Viverra.*

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{4-4}{4-4}$, $m\,\frac{2-2}{2-2}=40$.

4264. The skeleton of the Civet (*Viverra Civetta*).

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 3 sacral: there are 23 caudal vertebræ, but a few of the terminal ones are wanting. The fourteenth pair of ribs is absent,

together wth the hyoid arch and fabellæ. The transverse processes of the cervical vertebræ, consisting of the diapophysis only, are not perforated. Anapophyses begin to be developed upon the tenth dorsal, and are continued to the penultimate lumbar vertebra. Nine pairs of ribs directly join the sternum, which consists of eight bones with the xiphoid appendage. The scapula is longer, more quadrate, and more equally bisected by the spine than in the *Mustelidæ*: the acromion is bifid, but its divisions are less distinct. The bones of the extremities are longer and more slender. The humerus is imperforate at the inner condyle, but is pierced between the condyles. The first or innermost digit is relatively shorter on both the fore and hind limbs than in the *Mustelidæ*, taking no share in the support of the body. Hæmapophyses are developed beneath some of the caudal vertebræ. The hæmal canal ceases after the tenth caudal vertebra. An articular pit behind the external condyle of the femur indicates the existence of a fabella.

Mus. Brookes.

4265. The vertically and longitudinally bisected cranium of the Civet (*Viverra Civetta*).

The occipital condyles are separate from each other at their lower extremities. The paroccipitals and mastoids have coalesced and form a triangular plate of bone, applied to the posterior part of the tympanic bulla, like the capsule of the acorn to the seed. This bulla is more circumscribed and much more developed than in the Otter: the bony meatus auditorius is much shorter, and opens directly into the tympanic cavity. The cranial cavity is longer and narrower, and the postorbital constriction much less, than in the *Mustelidæ*. The bony tentorium is continued forwards beyond the petrosal, and terminates above the foramen rotundum. The petrosal is impressed by a deep pit for the cerebellar appendage. A vertical inverted tract of the cranial walls divides the prosencephalic from the rhinencephalic compartments. The olfactory fossa is continued backwards above as well as beneath the rhinencephalic compartment. The crista galli is rudimental. The occipital region of the skull is a triangle, higher than it is broad. The nasal processes of the upper maxillaries extend backwards much further than the nasal bones, the reverse being the case in the Otter. The pterygoid processes are perforated by the ectocarotids. The dental formula of the genus *Viverra* is well displayed in this specimen.

Hunterian.

The following, to No. 4282 inclusive, are parts of the same skeleton of the *Viverra Civetta*:—

Hunterian.

4266. The atlas.

The transverse processes have a more extensive origin than in the Otter, and they are perforated both horizontally and vertically by the vertebral artery before it pierces the neural arch.

4267. The vertebra dentata.

The median inferior ridge, and the two lateral ones continued upon the transverse processes, are longer, deeper, and sharper than in the Otter.

4268. The third cervical vertebra.

4269. The bones of the thorax, wanting the last dorsal vertebra and its ribs.

The nine anterior pairs of ribs articulate directly with the sternum.

4270. Two lumbar vertebræ.

They show the reception of the prozygapophyses of one vertebra in the interspace between the postzygapophyses and the anapophyses of the antecedent vertebra.

4271. The last lumbar vertebra.

In this the anapophyses are suppressed.

4272. The sacrum.

It consists of three anchylosed vertebræ.

4273. The right scapula.

4274. The right humerus.

It is pierced both between the condyles and above the inner condyle.

4275. The right radius.

4276. The right ulna.

4277. The two ossa innominata.

4278. The right femur.

A ridge extends from the great trochanter more than half-way down the shaft of the bone.

4279. The right tibia.

4280. The right fibula.

4281. The right calcaneum.

4282. The right astragalus.

4283. The skeleton of the Genette (*Viverra Genetta*).

The vertebral formula is :—7 cervical, 13 dorsal, 7 lumbar, 3 sacral, and 28 caudal. The transverse processes of the last cervical are imperforate, and consist only of the diapophysis. The eleventh dorsal vertebra is that to which the spines of the other trunk-vertebræ converge. The anapophyses commence on the tenth dorsal, and continue to the penultimate lumbar vertebræ. Nine pairs of ribs articulate directly with the sternum, which has eight bones and a xiphoid cartilage. The upper costa of the scapula is rounded above : the supraspinal is not deeper than the infraspinal fossa : the acromion is triangular and bent down, but scarcely, if at all, bifid. The humerus is perforated above the inner condyle, but not between the condyles. There is a fabella behind the outer condyle of each femur. The left femur is much diseased.

Mus. South.

4284. The skull of the Genette (*Viverra Genetta*).

The teeth have been removed from the right side of both upper and lower jaws, and are separately displayed, their nature being indicated by the symbols, according to the Table of Synonyms. The paroccipital forms, as in the Civet, a triangular support or capsule to the back part of the tympanic bulla.

Hunterian.

Genus *Paradoxurus*.

Dental formula :—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{4-4}{4-4}$, $m\frac{2-2}{2-2}=40$.

4285. The skeleton of a Musang or Palm-Civet (*Paradoxurus*).

The vertebral formula is :—7 cervical, 13 dorsal, 7 lumbar, 2 sacral, and 33 caudal. Eight pairs of ribs articulate directly with the sternum, which consists of eight bones. The upper border of the scapula is more convex than in the Genette, and the supra- and infra-spinal divisions are of equal extent. The inner condyle of the humerus is pierced, but not the condyloid interspace. The molar teeth correspond with those ascribed to the *Paradoxurus Hamiltoni* in De Blainville's 'Ostéographie,' pl. xii. The spines of the third and fourth cervical vertebræ are less developed than in the *Paradoxurus typus* : the caudal vertebræ are relatively longer, and consequently the whole tail.

Mus. South.

The following, to No. 4303 inclusive, are parts of the same skeleton of the Palm-Civet (*Paradoxurus typus*) :—

Presented by the Zoological Society of London.

4286. A mutilated skull, with the dental series of one side separately displayed.

The right squamosal has been removed, showing the extensive surface of the parietal and alisphenoid to which it was applied, and the small vacuity in the suture between those bones which was left for it to cover in completing the cranial walls. The tympanic and ossicula

auditus are left *in situ*. The bulla ossea is formed exclusively by the petrosal; the mastoid is feebly developed in the angle, between the petrosal, paroccipital and parietal. The removal of part of the right frontal shows the extent to which the rhinencephalic fossa is surrounded by the olfactory chamber.

4287. The atlas.

The transverse process is perforated both horizontally and vertically by the vertebral artery: the neural arch is, also, perforated on each side.

4288. The axis.

4289. Two cervical vertebræ.

4290. Eight dorsal vertebræ.

4291. Seven lumbar vertebræ.

4292. The sacrum.

4293. Twenty-two caudal vertebræ.

4294. Eight pairs of thoracic ribs.

4295. Two scapulæ.

4296. The left humerus.

4297. The left ulna.

4298. The left radius.

4299. The ossa innominata.

4300. The right femur.

4301. The right tibia.

4302. The right fibula.

4303. The two patellæ.

4304. The skull of a young Palm-Civet (*Paradoxurus*), showing the deciduous dentition. *Purchased.*

4305. The skeleton of an immature example of one of the *Viverridæ*, with the deciduous dentition.

The vertebral formula is:—7 cervical, 15 dorsal, 5 lumbar, 3 sacral: there are 23 caudal vertebræ, but the series is incomplete. It is ascribed to the Genet in the Sale-Catalogue of Brookes' Museum and in the Osteological Catalogue of 1831, but from the size and shape of the cranial cavity, and the shortness of the postorbital processes, it is probably the young of a species of *Paradoxurus*.

Mus. Brookes.

Genus *Mangusta.*

Dental formula :—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{4-4}{4-4}$, $m\,\frac{2-2}{2-2}=40$.

4306. The skeleton of an immature Ichneumon (*Mangusta Ichneumon*).

The vertebral formula is :—7 cervical, 13 dorsal, 7 lumbar, 2 sacral, and 27 caudal. The tenth dorsal is that towards which the spines of the other trunk-vertebræ converge. Nine pairs of ribs articulate directly with the sternum, which has eight bones and a xiphoid cartilage. There are no clavicles. The upper contour of the scapula is slightly sigmoid, very convex anteriorly, and the supraspinal fossa is larger than the infraspinal one. The acromion is bifid. The humerus is pierced both between the condyles and above the inner condyle. The femur has a fabella behind the outer condyle: the orbital processes of the frontal and malar are well developed, and the ligament which connects them becomes ossified in old individuals.

Mus. South.

4307. The skull of a Mongoose Ichneumon (*Mangusta Mongos*).

The orbital processes of the frontal and malar bones have met, and circumscribe the orbits*.

Hunterian.

The following, to No. 4312 inclusive, are parts of the same skeleton of a female Mongoose Ichneumon (*Mangusta Mongos*) :—

Purchased.

4308. The skull.

4309. The vertebral column of the trunk and tail.

The transverse process of the atlas is perforated both horizontally and vertically by the vertebral artery. The spine of the third cervical is almost obsolete. There are 13 dorsal vertebræ: the metapophyses begin to be developed on the tenth dorsal; the eleventh is that towards which the spines of the other dorsal vertebræ converge. There are 7 lumbar, 3 sacral, and 29 caudal vertebræ: some of the anterior caudals have hæmapophyses.

4310. Part of the hyoidean arch.

The right ceratohyal and stylohyal are wanting.

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* This is the skull of the individual painted by Stubbs, with the Agouti and Peccary, in the Hunterian picture, No. 37.

4311. The anterior extremities.

They show the perforations between the condyles and above the inner condyle of the humerus, and the sesamoid ossicle exterior to the trapezium.

4312. The posterior extremities.

They show the sesamoid ossicle external to the outer condyle of the femur, besides the fabella, which is placed above it.

The following, to No. 4322 inclusive, are parts of the same skeleton of the *Mangusta Mongos* :—

Hunterian.

4313. The vertically and longitudinally bisected skull.

4314. The atlas.

4315. The axis.

4316. Five lumbar vertebræ.

4317. The sacrum and seven caudal vertebræ.

4318. The right scapula.

4319. The right humerus.

4320. The left radius and ulna.

4321. The right ossa innominata.

4322. The left tibia, fibula, tarsus, and metatarsus.

4323. The skull of the male Egyptian Ichneumon (*Mangusta Pharaonis*).

It is remarkable for the constriction between the cranial and olfactory chambers, and for the great development of the tympanic bullæ, which are divided into a true petrosal and tympanic portions. The meatus auditorius is triangular, and passes directly inwards; the zygomatic arches spring out a short way in advance of the meatus. The frontal and malar processes meet behind the orbit. The sutures are obliterated.

Purchased.

4324. The skull of the male Cape Ichneumon (*Mangusta urinator*).

The first premolar does not exist in either jaw, nor is there any trace of the socket. The orbits are incomplete behind. The anterior and posterior margins of the upper canines are short and slightly produced; the cingulum of *p* 3 is well-developed.

Purchased.

4325. The skull of a not quite mature female *Mangusta urinator.*

All the permanent teeth have been acquired, except the upper canines, the deciduous predecessors of which are still retained; the pulp-cavity of the milk-canine is exposed by the absorption of the whole anterior half of the fang. Almost immediately behind this is the premolar p 2, without any trace of p 1 or of its socket.

Purchased.

Genus *Ryzæna.*

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{3-3}{3-3}$, $m\,\frac{2-2}{2-2}=36$.

4326. The skeleton of a Suricate (*Ryzæna tetradactyla*).

The vertebral formula is:—7 cervical, 15 dorsal, 6 lumbar, 3 sacral, and 20 caudal; but the extremity of the tail is wanting. The twelfth dorsal is that towards which the spines of the other vertebræ converge. The humerus is perforated above the inner condyle.

Mus. Brookes.

4327. The skull of an immature female of the Suricate (*Ryzæna tetradactyla*).

The permanent incisors and true molars have come into place in both jaws. In the upper jaw the crowns of p 2 and p 3 have protruded from their sockets, and p 4 is in place; the points of the permanent canines have also appeared, but the deciduous ones are retained. In the lower jaw p 2 is in place, but the deciduous m 3 and m 4 are still retained: the points of the permanent canines appear on the inner sides of the deciduous ones. There is no trace of p 1 or of its socket in either jaw.

Purchased.

Family *Canidæ.*

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{4-4}{4-4}$, $m\,\frac{2-2}{3-3}=42$.

Genus *Canis.*

4328. The skeleton of the Common Fox (*Canis Vulpes*).

The vertebral formula is:—7 cervical, 13 dorsal, 7 lumbar, 3 sacral, and 22 caudal. The transverse processes of the last cervical are imperforate. Nine pairs of ribs articulate directly with the sternum, which consists of eight bones and a xiphoid cartilage. The eleventh dorsal is that towards which the spines of the other trunk-vertebræ converge. The anapophyses begin to be developed on the seventh dorsal, and are reduced to mere tubercles on the third lumbar. The supraspinal part of the scapula is less deep than the infraspinal one; the upper contour of the bone shows two obtuse angles: the acromion is short and broad, partially bent down, but not notched or bifid. The clavicular bones are not preserved. The humerus is pierced between the condyles, but not above the inner condyle. The pollex is shorter than the metacarpal of the index. There is a fabella behind each condyle of the

femur. The slender fibula closely adheres to the lower half of the tibia. The hallux is reduced to a minute rudiment of its metatarsus. A few of the anterior caudal vertebræ have hæmapophyses: the supporting processes or 'hypapophyses' are developed from a greater number. The sacrum is remarkable for its sudden diminution of size, as compared with the lumbar vertebræ, and only the first sacral vertebra articulates directly with the iliac bones.

Hunterian.

4329. The skull of the Common Fox (*Canis Vulpes*).

The paroccipital is triangular and applied to the back part of the acoustic bulla, but is smaller and thicker than in the Paradoxuri, and stands off more from the bulla. The alisphenoid articulates with the parietal. The interparietal, which has anchylosed with the superoccipital, penetrates the posterior interspace of the parietals. The nasal processes of the maxillaries are truncate, and terminate on the same transverse line as the nasals. The maxillaries directly articulate with the middle part of the nasals. The dental series is complete on the right side of this cranium.

Mus. Brookes.

4330. The skull of the Common Fox (*Canis Vulpes*).

The base of the cranium is mutilated: the dental series is entire. The teeth have been removed from the right half of both upper and lower jaws, and are separately displayed. The symbols indicate their nature according to the TABLE OF SYNONYMS.

Purchased.

4331. The skull of a female Fox (*Canis Vulpes*).

The dental system is complete: the calvarium has been removed to show the bony tentorium, which appears to be developed from the superoccipital.

Purchased.

4332. The skull of the Black Fox (*Canis Vulpes*).

This is a large variety of the common species. The teeth and the sutures correspond with those in No. 4329.

Presented by Henry Cline, Esq.

4333. The skull of the Italian Fox (*Canis melanogaster*).

Like the Isatis (No. 4335), the maxillaries articulate with a smaller proportion of the nasals than in the Common Fox: this difference is well seen by comparing the present skull with that of the female of the Common Fox (No. 4331), in which the muzzle is absolutely shorter. The canines are longer and more slender in the Italian Fox. The accessory tubercles of the premolars are better marked. This species or variety is more frugivorous than the northern one, and plunders the vineyards at the wine season.

Presented by H.I.H. Charles Lucien Bonaparte, Prince of Canino.

4334. The skull of the American Cross Fox (*Canis decussatus*).

It appears to be only a large and powerful variety of the Common Fox.

Presented by Sir John Richardson, M.D.

4335. The skull of the Isatis, or Arctic Fox (*Canis lagopus*).

It agrees in size with that of the specimen No. 4329, but has a shorter facial portion, and the maxillary bones articulate with a smaller proportion of the nasals. The dental system is complete and resembles that of the Common Fox.

Presented by Henry Cline, Esq.

4336. The skull, wanting the lower jaw, of a not full-grown Isatis (*Canis lagopus*).

The squamosal has been removed from the right side, showing the portion of the cranial cavity which it protects.

Mus. Brookes.

The following, to No. 4357 inclusive, are parts of the same skeleton of a female Isatis (*Canis lagopus*) :—

Hunterian.

4337. The vertically and longitudinally bisected cranium.

4338. The lower jaw.

4339. The atlas.

The transverse process is perforated obliquely and notched anteriorly by the vertebral artery before it pierces the neural arch.

4340. The axis.

4341. The five following cervical vertebræ.

4342. An anterior dorsal vertebra.

4343. The tenth and eleventh dorsal vertebræ.

They show well the distinction between the diapophyses and the anapophyses.

4344. The first and second lumbar vertebræ.

The diapophyses are here elongated by the connate pleurapophyses. The anapophyses are marked *a*.

4345. The last two lumbar vertebræ.

The metapophyses have disappeared. The diapophyses are much produced by the connate pleurapophyses.

4346. The sacrum.

It consists of three anchylosed vertebræ: the articular surface for the ilium extends from the first upon the sides of the fore part of the second vertebra.

4347. The ten anterior caudal vertebræ.

Hæmal arches are attached to the fourth, fifth and sixth vertebræ, and the processes corresponding thereto on the succeeding vertebræ. The hæmal canal becomes open on the seventh vertebra.

4348. The right scapula.

4349. The right humerus.

4350. The right radius.

4351. The right ulna.

4352. The carpus, metacarpus, and some of the phalanges.

The scaphoides and lunare have coalesced: there is a small accessory ossicle, external to the trapezium.

4353. The right os innominatum.

4354. The right femur.

The medullary artery has penetrated the middle of the anterior surface, and the canal inclines upwards, but this is a variety in its position and course.

4355. The right tibia.

4356. The right fibula.

4357. The right tarsus and metatarsus.

4358. The skull of the Fennec, or Long-eared Fox (*Canis zerda*).

It is remarkable for the great expanse of the acoustic bullæ, and the corresponding width of the auditory meatus, and, as in other diminutive species of a natural group, the immature

disproportion of the cranium to the face is retained. The nasal processes of the maxillary ascend a little beyond the nasals, and articulate with the hinder half of those bones, the interposed anterior angles of the frontal being much less produced than in the Foxes. The premaxillaries are relatively larger. The teeth have been removed and separately displayed, from the left side of the upper and from the right side of the lower jaw; the series is not quite complete, but the alveoli demonstrate the same dental formula as in the rest of the genus.

Presented by the Zoological Society.

4359. The upper jaw, and part of the lower jaw, of the Cape Fox (*Proteles Lalandii*).

The dentition of this singular genus, although corresponding with that of the genus *Canis* in the deciduous series, deviates extraordinarily in the permanent state, especially in regard to the molar series. In the present specimen there are $i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, three small and simple premolars on the left side, and one on the right side of the upper jaw, two similar premolars and the socket of a smaller premolar on the right side of the lower jaw, and two simple premolars on the portion of the left ramus of the same jaw which is here preserved.

Presented by Henry Salt, Esq.

4360. The skull of the Jackal (*Canis aureus*).

The interorbital part of the frontals is more convex than in the Fox. The hind points of the nasals extend a little further back than the maxillaries, the nasal processes of which are more pointed. The facial part of the skull is shorter and stronger.

From India.

Presented by Dr. Henderson.

4361. The skull of a Jackal (*Canis aureus*).

It corresponds with the preceding specimen, and differs in the same particulars from the Fox. The molar teeth, especially the carnassials, are relatively larger.

From the Himalaya Mountains.

Presented by Colonel Finch.

4362. The skull of the Cape Jackal (*Canis mesomelas*).

It differs from the Indian Jackal by the minor development of the postorbitar processes; but this may depend upon the difference of age of the specimens compared, the temporal ridges not having met above the parietal bones, and the interorbital portion of the frontals not being so well defined; but this portion differs from that in the Isatis and other foxes in its greater degree of convexity, and the nasal bones, as in other Jackals, extend further back than the maxillaries. The lacrymal also encroaches a little upon the face.

Purchased.

4363. The skull of a species of *Canis*, called the Falkland Island Fox.

It agrees in size with that of the Jackal, and, like it, differs from the skull of the Fox in the greater convexity and expanse of the frontals. The hinder ends of the nasals, as in No. 4361, are more nearly on a level with the maxillaries. The second lower premolar is a little further removed from the third.

Presented by Admiral Beaufort, C.B., F.R.S.

4364. The skeleton of an Arctic Wolf (*Canis Lupus*).

The vertebral formula is :—7 cervical, 13 dorsal, 7 lumbar, 3 sacral, and 15 caudal. Eight pairs of ribs articulate directly with the sternum, which consists of eight bones. The last cervical has the transverse process imperforate. The eleventh dorsal vertebra is that towards which the spines of the other trunk-vertebræ converge. Metapophyses begin to be developed on the eighth dorsal, and are continued to the fourth lumbar vertebra. The bones of the extremities correspond in type with those of the Fox, but have more robust proportions.

Presented by Alexander Fisher, Esq.

4365. The skull of a large male Wolf (*Canis Lupus*).

Like the Jackal, it differs from the Fox in the median depression and transverse convexity of the frontal region produced by the bending down of the postorbital processes ; in the greater posterior extension of the nasals, as compared with the maxillaries ; and in the encroachment of the lacrymal on the face. The frontal bones preserve a more uniform breadth than in the Jackal, being less expanded posteriorly where they join the parietals. The last true molar is wanting in the lower jaw of this specimen.

Presented by Henry Cline, Esq.

4366. The skull of a male Wolf (*Canis Lupus*).

Presented by Sir Stamford Raffles, P.Z.S.

4367. The skull of a male Arctic Wolf (*Canis Lupus*).

It corresponds in size with the preceding specimen, but the interorbital part of the frontals is rather less convex transversely.

From Melville Island.

Presented by Captain Sir Edward Parry, R.N.

4368. The skull of a Wolf (*Canis Lupus*). *Mus. Brookes.*

4369. The skull of a female Wolf (*Canis Lupus*). *Purchased.*

4370. The skull of a female Arctic Wolf (*Canis Lupus*).

The frontal bone exhibits partial fractures, which have been healed. The tympanic bulla has been laid open, showing the very oblique inner termination of the short and wide meatus

auditorius. The base of the zygomatic process is pierced by a vertical venous canal. The first premolar has been shed, and its socket obliterated in both jaws.

From Melville Island.

Presented by Captain Sir Edward Parry, R.N.

4371. The skull, vertically and longitudinally bisected, of a Wolf (*Canis Lupus*).

Hunterian.

4372. The upper and lower jaws of a Wolf (*Canis Lupus*).

The teeth have been removed from the left side of both jaws, and are separately displayed; their symbols indicate their nature according to the TABLE OF SYNONYMS.

From Labrador.

Hunterian.

The following, to No. 4387 inclusive, are parts of the skeleton of a Wolf (*Canis Lupus*):—

Hunterian.

4373. The skull.

4374. The atlas.

4375. The axis.

4376. A cervical vertebra.

4377. A dorsal vertebra.

4378. A lumbar vertebra.

4379. The sacrum.

4380. The ossa innominata.

4381. The right scapula.

4382. The right humerus.

4383. The right ulna.

4384. The right radius.

4385. Two thoracic ribs.

4386. The right femur.

4387. The right tibia and fibula.

4388. The pelvis and last lumbar vertebra anchylosed thereto, of a Wolf (*Canis Lupus*). *Hunterian.*

4389. The skeleton of the Dingo, or Wild Dog of Australia (*Canis Dingo*).

The vertebral formula agrees with that of the Wolf, and the differences in the bones generally are merely those of size.

Presented by Sir Everard Home, Bart., V.P.R.S.

4390. The skull and atlas of a male Dingo (*Canis Dingo*).

Like the Jackal and Wolf, the Dingo differs from the Fox in the greater transverse convexity of the frontals, especially opposite the postorbital processes, and in the greater longitudinal depression between the frontals; in the greater posterior extension of the nasals, as compared with the maxillaries; and in the encroachment of the lacrymal bone upon the face. An interesting exemplification of characters of affinity, as contrasted with those of adaptation, is afforded by a comparison of this skull with that of the Marsupial Carnivore (*Thylacinus Harrisii*) from the same part of the world, which equals the Dingo in size, agrees with it in general outward form, and has similar habits, food, and mode of life.

The first and most striking difference is the comparative superiority of the cerebral cavity in the Dog, and of the olfactory cavity in the Thylacine, the proportions being reversed in the two specimens. The superoccipital overhangs the foramen magnum in the Dog, but is on the same vertical plane with it in the Thylacine. The paroccipitals are more compressed in the Thylacine, and their base is not applied to the acoustic bulla, which is of much smaller size and formed exclusively by the alisphenoid, not by the petrosal and tympanic, as in the Dog. The tympanic has preserved its distinctness in the Thylacine, but has coalesced with other elements of the temporal bone in the Dog. A wide and deep groove divides the bulla from the basisphenoid in the Thylacine, but the sides of the basisphenoid in the Dingo are swollen and abut against the large tympanic bullæ. The articular cavities for the lower jaw are much nearer the occiput in the Thylacine than in the Dingo, and the malar bones enter partially into their formation. There are two large vacuities in the back part of the bony palate in the Thylacine, but this part is entire in the Dingo. The antorbital foramina are larger in the Thylacine and much nearer the orbits than in the Dingo; they are also formed partly by the malar, and are not wholly perforated in the maxillary bone, as in the Dingo: the lacrymal bone is much larger in the Dingo, and encroaches much more upon the face: the nasal bones are broader posteriorly in the Dingo, and extend further back, as compared with the maxillaries. The calvarium has been removed from the two specimens compared (Nos. 1905 and 4390), to show more distinctly the different proportions of the cerebral and olfactory cavities: the petrosals are much larger in the Dingo, and send bony plates into the tentorium, which plates are not present in the Thylacine. The sella turcica is defined by the posterior clinoid processes in the Dingo, but not in the Thylacine. The foramina optica and lacera anteriora are blended together in the Thylacine, but are distinct in the Dog. Although the olfactory chamber is so much larger in the Thylacine, the rhinencephalic fossa is smaller than in the Dog. The lower jaw, besides its greater length and slenderness in the Thylacine, differs by the bending in of the angle, which is the characteristic of the Marsupials. In most of these distinctions the Thylacine manifests its nearer affinity to the oviparous type of skeleton. The difference in the dental formula is more decisive than the osteological ones; but in the greater number, and the greater conformity of shape of the molar teeth of the Thylacine, there may also be discerned a greater conformity with the inferior type of vertebrate organization.

Presented by Governor Sir George Grey, C.B.

4391. The skull, somewhat mutilated, of a female Dingo (*Canis Dingo*).

Presented by Governor Sir George Grey, C.B.

4392. The skeleton of a large Newfoundland Dog (*Canis familiaris*, var. *extrarius*).

The bones of the trunk and limbs differ from those of the Wolf in their somewhat more robust proportions.

Hunterian.

4393. The skeleton of the large variety of Mastiff called Mount St. Bernard's Dog (*Canis familiaris*, var. *anglicus*).

The os penis is preserved with this skeleton. The hallux, or inner toe of the hind-foot, is fully developed, but is small.

Presented by G. J. Guthrie, Esq.

4394. The skeleton of a Greyhound (*Canis familiaris*, var. *Grajus*).

It is characterized by the more slender proportions of the bones. Four vertebræ are anchylosed to form the sacrum. The bones of the trunk are larger, and those of the extremities longer, in proportion to the head, than in the Dingo.

Mus. South.

4395. The skeleton of the Italian Greyhound (*Canis familiaris*, var. *italicus*).

This small and slender variety of Dog is chiefly distinguished by the disproportionate size of the cranium, and the absence of the cristæ and ridges on its external surface, which characterize the larger and stronger varieties.

Presented by Sir Anthony Carlisle, F.R.S.

4396. The skeleton of the fœtus of a Shepherd's Dog (*Canis familiaris*), wanting the tail.

It shows the narrow triangular interparietal; the separation of the neurapophyses from each other and from the centrum in the trunk-vertebræ; the extent of ossification in the ilia and ischia, whilst the pubis remains cartilaginous; the great disproportion of the cranium over the face, and the equal extent of the maxillary bone, behind the suborbital foramen, to that which is in front of the foramen. The tympanic bone presents the form of a simple ring.

Mus. Brookes.

4397. The skull of a Wild Dog (*Canis familiaris*).

It differs from that of the Dingo, No. 4390, by the greater development of the frontal sinuses, and the corresponding increase in height and breadth of the frontal part of the cranium.

From the Himalaya Mountains.

Purchased.

4398. The skull, vertically and longitudinally bisected, of a Wild Dog (*Canis familiaris*).

The bony tentorium projeets from near the middle of the oceipital wall, and does not reach the petrosal; but the ridge of the petrosal is thin, and produeed into the membranous tentorium. The petrosal fossa is narrow and deep: the bone is perforated near its apex, whieh projeets freely forwards and inwards; it is merely notched in the Fox, as in the Otter, Badger, and Coati. A vertieal vaseular groove divides the prosencephalic from the rhinencephalie eompartments. The lateral sinus perforates the exoeeipital, but both orifices of the eanal are within the eranium; one braneh of the lateral sinus deseends and opens externally at the base of the squamosal behind the postglenoid process.

From the East Indies.

Purchased.

4399. The skull of the Shepherd's Dog (*Canis familiaris*).

It differs from the two preceding in the somewhat larger development of the eerebral eavity and the small expanse of the frontal sinuses, but agrees with them in size, whieh is that of the Dingo.

Purchased.

4400. The skull of a Dog, from a bog near Drogheda.

It eorresponds most closely with that of the Shepherd's Dog, and, like it, differs from those of the Wild Dog, Nos. 4397 & 4398, in the greater expanse of the eerebral eavity.

Presented by the Earl of Enniskillen, D.C.L.

4401. The skull of a similar variety of Dog, from a bog near Drogheda.

It has feebler zygomata and somewhat narrower jaws, and probably belonged to a female.

Presented by the Earl of Enniskillen, D.C.L.

4402. The skull of a Mastiff (*Canis familiaris*, var. *anglicus*).

It differs from that of the Shepherd's Dog in the greater elevation of the frontal region of the eranium, and in the deeper coneavity between that and the faeial portion. The nasal bones extend further baek than the maxillaries.

Hunterian.

4403. The skull of a large Newfoundland Dog (*Canis familiaris*, var. *extrarius*).

In this variety the frontal region is more elevated than in the Shepherd's Dog, but less suddenly so than in the Mastiff. In comparison with the skull of a Wolf of about the same size, the differenee is seen in the greater breadth and depth, with the minor length of the jaws, the more eonvex inferior contour of the lower jaw, the greater elevation and breadth of the frontal region, the minor expanse of the aeoustie bullæ, and the greater breadth of the eondyles of the lower jaw.

Purchased.

4404. The skull of a Blood-hound (*Canis familiaris*, var. *sanguinarius*).

The frontal region is rather more elevated, and more convex at the sides than in the preceding specimen.

Purchased.

4405. The cranium of a Greyhound (*Canis familiaris*, var. *Grajus*).

This is characterized by its more slender proportions, as compared with its length, and by the less elevation and expanse of the frontal region. The acoustic bullæ are more expanded.

Purchased.

4406. The skull of a large Terrier (*Canis familiaris*, var. *fossorius*).

It is broader than the preceding, but is one-fifth shorter, the diminished length being chiefly in the jaws: the frontal region is more elevated, and the concavity greater between that and the nasal.

Purchased.

4407. The skull of a somewhat smaller Terrier (*Canis familiaris*, var. *fossorius*).

It shows a similar contour of the nasal region and a similar elevation of the frontal, and differs from the preceding specimen chiefly in the greater relative size of the cerebral cavity.

Purchased.

4408. The skull of a smaller variety of Terrier (*Canis familiaris*, var. *fossorius*).

In this specimen the cerebral cavity still more predominates, and the frontal region is more suddenly elevated. The first premolar and its socket are wanting in both sides of the upper jaw.

Purchased.

4409. The skull of a Pointer (*Canis familiaris*, var. *aviarius*).

It agrees in size with that of the Shepherd's Dog, and differs in the greater expanse of the frontal sinuses, producing a corresponding elevation of the frontal region.

Purchased.

4410. The skull of a Setter (*Canis familiaris*, var. *aviarius*).

This differs from the Pointer in the greater relative expanse of the cerebral cavity, and in the shorter zygomatic arches and jaws. The premolars are more closely set. The sagittal crista is less marked, and the contour of the cranium is more rounded.

Purchased.

4411. The skull of a Water Spaniel (*Canis familiaris*, var. *aquaticus*).

Though somewhat smaller than the preceding, the cerebral cavity is proportionally rather less; the frontal region is narrower, more depressed in the middle, but rises more suddenly from the nasal region, the orbits being a little higher.

Purchased.

4412. The skull of a common Spaniel (*Canis familiaris*, var. *Hispanicus*).

It differs from the preceding chiefly by its smaller size, and the jaws being relatively somewhat narrower.

Purchased.

4413. The skull, vertically and longitudinally bisected, of a similarly-sized Spaniel.

The cerebral cavity is almost absolutely as large as that of No. 4398, but the epencephalic and rhinencephalic compartments are shorter, the frontal sinuses are less developed, and the olfactory chamber is much shorter.

Purchased.

4414. The skull, with the left ramus of the lower jaw and the os penis, of a Spaniel (*Canis familiaris*, var. *Hispanicus*). *Presented by William Clift, Esq., F.R.S.*

4415. The cranium of a Blenheim Spaniel (*Canis familiaris*, var. *Hispanicus minor*).

It differs from the preceding specimen in the greater relative expanse of the cerebral cavity, the much shorter jaws, the sudden elevation of the frontal region, the breadth of the smooth tract between the temporal ridges, and the non-development of postorbital processes. The interparietal extends along more than half of the sagittal suture, and terminates by a truncated extremity.

Purchased.

4416. The skull of a King Charles' Spaniel (*Canis familiaris*, var. *brevipilis*).

It resembles the preceding in all essential characters, but the frontal region is less suddenly elevated and the zygomatic arches less expanded. The os penis of the same animal is here preserved.

Presented by William Home Clift, Esq.

4417. A skull of a young King Charles' Spaniel.

It shows the deciduous dentition: there are seven milk incisors in the upper jaw, the right premaxillary having four: the incisors are of the normal number in the lower jaw. The interparietal has entirely divided the parietals from each other, and the fontanelle is still open between these and the frontal.

Purchased.

4418. The skull of the Pug-dog (*Canis familiaris*, var. *fricator*).

It is characterized by the depression between the short nasals, the sudden elevation of the frontals, the great relative expanse of the cerebral cavity, the shortness of the jaws, and the upward curve of the lower jaw; but the sutures have the same characteristic disposition as in the skull of the Wild Dog (No. 4397); the difference in form in this and other small varieties of the species depending chiefly on the retention of more or less of the immature characters, which are exemplified in the following specimen.

Purchased.

4419. The skull of a fœtal dog, but near the time of birth (*Canis familiaris*).

Purchased.

The following, to No. 4438 inclusive, are parts of the skeleton of a Dog (*Canis familiaris*):—

Hunterian.

4420. The cranium.

4421. The two rami of the lower jaw.

4422. The atlas.

4423. The axis.

4424. A cervical vertebra.

4425. A dorsal vertebra.

4426. A lumbar vertebra.

4427. The sacrum.

4428. The pelvis.

4429. Two thoracic ribs.

4430. The right scapula.

4431. The right humerus.

4432. The right ulna.

4433. The right radius.

4434. The right femur.

4435. The right tibia.

4436. The right fibula.

4437. The patella.

4438. The right calcaneum.

4439. The cranium of a Dog, in three transverse sections.

The posterior section shows the form of the epencephalic and tympanic chambers, and the share which the interparietal takes in forming the walls of the former. The middle section shows, posteriorly, the inner expanded termination of the auditory meatus, the cochlear chamber, the single, obtuse, postclinoid process; and, anteriorly, the termination of the frontal sinuses. The anterior section shows the entire extent of the rhinencephalic chamber, and its relative position to the olfactory and frontal chambers. There is no crista galli.

Presented by Prof. Owen, F.R.S.

4440. The right anterior extremity of a Newfoundland Dog (*Canis familiaris*, var. *extraneus*). *Hunterian.*

4441. The bones of the right posterior extremity of the same Dog. *Hunterian.*

4442. The bones of the right anterior extremity of a Greyhound (*Canis familiaris*, var. *Grajus*). *Purchased.*

4443. The bones of the right posterior extremity of a Greyhound (*Canis familiaris*, var. *Grajus*). *Hunterian.*

4444. The bones of the anterior extremity of a Spaniel (*Canis familiaris*, var. *Hispanicus*). *Purchased.*

4445. The right humerus, longitudinally bisected, of a Dog. *Hunterian.*

Genus *Hyæna.*

Dental formula:—$i\,\frac{3-3}{3-3},\ c\,\frac{1-1}{1-1},\ p\,\frac{4-4}{3-3},\ m\,\frac{1-1}{1-1}=34.$

4446. The skeleton of the Spotted Hyæna (*Hyæna crocuta*).

The vertebral formula is:—7 cervical, 15 dorsal, 5 lumbar, 4 sacral, and 19 caudal: the first caudal has become anchylosed to the normal sacrum in this aged individual. Eight pairs of ribs articulate directly with the sternum, which consists of eight bones: the dried costal cartilages are preserved. The transverse processes of the atlas are perforated longitudinally and vertically by the vertebral artery before this perforates the neural arch. The strong spine of the axis is bifid posteriorly; the transverse processes of the seventh cervical are imperforate. The convergence of the dorso-lumbar spines towards that of the thirteenth dorsal is feeble compared with other Carnivora. Anapophyses begin to be developed on the thirteenth dorsal and subside on the penultimate lumbar vertebræ. The humerus is neither pierced above the inner condyle nor between the condyles: it is thicker in proportion to its length than in the Dog, but is more bent and twisted: the same characters mark the radius and ulna, which are still shorter in proportion than in the Dog. The scaphoid and lunar bones are connate; the pollex is reduced to a rudiment of its metacarpus. The femur is more compressed antero-posteriorly than in the Dog, and the small trochanter is more posterior in position. The

neck is longer, and the head of the bone larger: there is a fabella behind each condyle. The tibia is shorter than the femur: the rotular ridge is less produced than in the Dog. The fibula is less flattened at its lower half, and more independent of the tibia than in the Dog. The entocuneiform supports a rudiment of the metatarsus of the hallux, as in the Dog: the calcaneal process is shorter, thicker, and more twisted inwards.

The animal from which the skeleton was prepared was purchased in the year 1821 by the Very Rev. Dr. Buckland, in order to carry on his experiments on the mode of feeding, and on the nature of the excrements, of the Hyæna, which experiments are detailed in the work entitled, 'Reliquiæ Diluvianæ,' p. 15 *et seq.* The creature lived in Mr. Cross's Menagerie until the year 1845, when it died, with an enormous goître.

Presented by the Very Rev. Dr. Buckland, F.R.S.

4447. The skull of the Spotted Hyæna (*Hyæna crocuta*).

The teeth have been removed from the right side of both jaws, and are separately displayed. The first simple premolar above, *p* 1, has no homotype below: the first premolar of the lower jaw has two roots, and answers to the second, *p* 2, above. The fourth tooth below, which is the carnassial or sectorial one, answers, as in other Carnivora, to the first of the true molar series, *m* 1, and corresponds to the small double-rooted tubercular molar, *m* 1, above. With the exception of the upper sectorial, the premolars have remarkably strong conical crowns, girt by a cingulum at the base, which developes a small accessory cusp posteriorly, and well adapts these teeth for the business of cracking and crushing the bones, which the Hyæna devours with the flesh of the carcasses on which it feeds. The affinity of the Hyæna to the *Viverridæ* is shown by the broad, triangular, rough plate formed by the paroccipitals and mastoids, and applied to the back part of the acoustic bullæ: but the pterygoid processes are not pierced by the ectocarotids. The strength of the muscles which work the jaw is shown by the extent of the temporal fossæ, the height of the sagittal crest, the thickness and the expanse of the zygomatic arches, the height of the coronoid processes, and the depth of the strongly-defined fossæ into which the great muscles of mastication are inserted. The antorbital foramina are small semilunar slits. The nasal processes of the maxillaries extend further back than the points of the nasals. There are two oblique foramina in the palatal processes of the maxillaries behind the incisive foramina. The palatines are imperforate.

Purchased.

4448. The skull of the Striped Hyæna (*Hyæna vulgaris*).

It corresponds pretty closely with that of the preceding specimen; but the cerebral cavity is proportionally less expanded, the molar teeth are relatively weaker; the upper tubercular molars are, however, larger, and the anterior accessory cusp at the base of the third and fourth upper premolars is better developed. There is a small additional cusp on the inner side of the posterior division of the lower carnassial tooth. In neither species does the maxillary join the nasal.

From the Himalaya Mountains.

Presented by Colonel Finch.

The following, to No. 4473 inclusive, are parts of the skeleton of an old Hyæna (*Hyæna vulgaris*) :—

Hunterian.

4449. The cranium.

4450. The rami of the lower jaw, divided at the symphysis.

4451. The atlas.

It is remarkable for the expanse of the transverse processes.

4452. The axis.

4453. The sixth and seventh cervical vertebræ.

They show the oblique cup-and-ball adaptation of their bodies, and the great expanse of the coalesced pleurapophysis of the sixth vertebra. The seventh shows no mark for the head of the first rib.

4454. A dorsal vertebra.

4455. A posterior dorsal vertebra.

The anapophyses are well-developed.

4456. A posterior lumbar vertebra.

The diapophyses are lengthened out by the connate pleurapophyses.

4457. The sacrum.

It consists of three anchylosed vertebræ. The spinous processes are distinct in each.

4458. A thoracic rib.

4459. The right scapula.

The infraspinal fossa is deeper than the supraspinal one : the upper costa presents an obtuse angle ; the acromion is small and simple.

4460. The right humerus.

The intercondyloid space is perforated.

4461. The right ulna.

4462. The right radius.

4463. The right scapholunar bone.

4464. The four metacarpals.

4465. The ossa innominata.

4466. The right femur.

The small trochanter is less posterior in position than in the *Hyæna crocuta*: the canal for the medullary artery enters the back part of the upper third of the shaft, and descends obliquely towards the cavity.

4467. The right tibia.

4468. The right fibula.

4469. The right astragalus.

4470. The right calcaneum.

4471. The four metatarsals.

The nondeveloped toe is the first or innermost in both fore and hind feet.

4472. The left femur, longitudinally bisected.

4473. The left tibia, longitudinally bisected.

4474. The cranium, vertically and longitudinally bisected, of the Hyæna (*Hyæna striata*).

The bony tentorium is continued upon the petrosal, and beyond it, to terminate above the Gasserian fossa. The petrosal pit is wide and shallow; the apex of the petrosal is deeply notched, corresponding with the perforation of the same part in the Dog. The cerebral cavity is more shallow than in the Dog, the height of the cranium being due to the extension of the frontal sinuses over the whole upper surface. This surface shows a united fracture, but the

depression in the bone has not extended beyond the sinuses*. The rhinencephalic compartment is surrounded by the olfactory chamber: the sella turcica is deep and well-defined: ossification has extended from the posterior to the anterior clinoid processes.

Presented by Prof. Owen, F.R.S.

Genus *Felis*.

Dental formula:—$i\,\frac{3-3}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{3-3}{2-2}$, $m\,\frac{1-1}{1-1}=30$.

4475. The skeleton of a male Lion (*Felis Leo*).

The vertebral formula is:—7 cervical, 13 dorsal, 7 lumbar, 3 sacral, and 23 caudal. The last cervical vertebra has the transverse processes imperforate, being formed only by diapophyses. The eleventh dorsal is that toward which the spines of the other trunk-vertebræ converge: the anapophyses begin to project backwards from this vertebra, and are continued to the penultimate lumbar. Eight pairs of ribs directly join the sternum, which consists of eight bones. The clavicular bone is preserved on the left side. The supraspinal fossa of the scapula is less deep than the infraspinal one, and its border is almost uniformly convex: the acromion is bifid, the recurved point being little larger than the extremity or anterior point. The humerus is perforated above the inner condyle, but not between the condyles. The scaphoid and lunar bones are connate. The pollex is retained on the fore-foot, and, like the other toes, is terminated by a large, compressed, retractile ungual phalanx, forming a deep sheath for the firm attachment of the large curved and sharp-pointed claws. This highly-developed unguiculate structure, with the dental system and concomitant modifications of the skull, completes the predatory character of the typical *Carnivora* forming the present genus.

Hunterian.

4476. The articulated bones of the right anterior extremity of a Lion (*Felis Leo*).

Hunterian.

4477. The articulated bones of the right posterior extremity of a Lion (*Felis Leo*).

Hunterian.

4478. The skull of an old male Lion (*Felis Leo*).

Its specific character is shown by the obtusely-pointed termination of the nasal process of the maxillary, and its extension backwards to the same transverse line as that which the hinder ends of the nasals reach. The carnivorous character of the skull, as exemplified by the sagittal and occipital crests, by the strength and expanse of the zygomatic arches, by the breadth, depth and shortness of the jaws, by the height of the coronoid processes, and by the

* A fossil cranium of the *Hyæna spelæa* (fig. 59, p. 154, Owen's 'History of British Fossil Mammals') exhibits the same circumstance, illustrative of the same combative habits in the extinct and recent species.

depth and extent of the muscular fossæ of the lower jaw, reaches its maximum in this skull. The triangular occipital region is remarkable for the depth and boldness of the sculpturing of its outer surface. The conjoined paroccipitals and mastoids form a broad and thick capsular support for the back part of the acoustic bullæ. The pterygoid processes are imperforate. A well-marked groove extends on each side of the bony palate from the posterior to the anterior palatine foramina. The premaxillaries are comparatively short, and one half of the lateral border of the nasals directly articulates with the maxillaries. The antorbital foramina are large.

Hunterian.

4479. The skull of a male Lion (*Felis Leo*).

In this are repeated all the characters of the species, sex and age shown in the preceding specimen: on the upper canines may be noticed two longitudinal grooves on both the outer and inner surfaces near the apex, and a single longitudinal groove on the outer side of the lower canines.

Hunterian.

4480. The skull of a male Lion (*Felis Leo*), with the dental system complete.

The molars of the upper jaw are *p* 2, *p* 3, *p* 4, and *m* 1 : those of the lower jaw are *p* 3, *p* 4, and *m* 1 : *p* 4 is the carnassial tooth above : it has a long tubercle on the inner and fore part of the blade, and this consists of three points; the lower carnassial is *m* 1, and consist of a bifid blade without accessory tubercles.

Purchased.

4481. The skull of an old Lioness (*Felis Leo*).

It repeats the specific character of the nasal processes of the maxillaries and the other characters of the skull of the Lion, but on a smaller scale.

Hunterian.

4482. The skull of a Lioness (*Felis Leo*).

The lower jaw is fractured. The calvarium has been removed to show the thin but compact walls of the cranial cavity, the continuation of the bony tentorium upon the overarching sides of the Gasserian fossa, the well-defined pituitary and chiasmal fossæ, the deep rhinencephalic chamber, and its relations to the overarching olfactory cavity and frontal sinuses.

Hunterian.

4483. The cranium, vertically and longitudinally bisected, of a Lioness (*Felis Leo*).

The bony tentorium extends above the petrosal to the ridge overhanging the Gasserian fossa: the petrosal is short, its apex is neither notched nor perforated: the cerebellar pit is very shallow. The sella turcica is deep, and well defined by both the anterior and posterior clinoids. The rhinencephalic fossa is relatively larger than in most Carnivora, and is defined by a well-marked angle of the inner table of the skull from the prosencephalic compartment:

the olfactory chamber extends backwards both above and below the rhinencephalic fossa: the upper part of the chamber is divided into two sinuses on each side: the superior turbinals extend into the anterior sinus, and below into the presphenoidal sinus. The constituent bones are numbered on coloured labels according to the TABLE OF SYNONYMS.

Hunterian.

4484. The skull of an Asiatic, or maneless Lion (*Felis Leo*).

It agrees with that of the African variety in the specific prolongation of the obtuse point of the nasal process of the maxillary; and differs from that variety only by the division of the left suborbital foramen.

From the north of Guzerat, Bombay.

Presented by Dr. Henderson.

4485. The skull of an Asiatic, or maneless Lion (*Felis Leo*).

Both suborbital foramina are divided into two. In all the foregoing skulls of both varieties of the Lion, the interorbital platform of the frontals is concave or flat between the bent-down postorbital processes.

From near Assund, Bombay.

Presented by Colonel Finch.

The following, to No. 4504 inclusive, are parts of the same skeleton of a Lion (*Felis Leo*):—

Hunterian.

4486. A section of the left maxillary, with the three premolars (*p* 2, *p* 3, *p* 4) and the tubercular molar (*m* 1). The last premolar (*p* 4) is called, from its shape, the 'carnassial,' or sectorial tooth: the penultimate one (*p* 3) had not fully come into place.

4487. The left carnassial (*m* 1) of the lower jaw.

4488. The atlas.

4489. The dentata.

4490. The sixth cervical vertebra.

4491. Two anterior dorsal vertebræ.

4492. Three posterior dorsal vertebræ.

4493. A lumbar vertebra.

4494. The sacrum.

4495. A thoracic rib.

4496. The right scapula.

4497. The right humerus.

4498. The right radius.

4499. The left ulna.

4500. The ossa innominata.

4501. The right femur.

4502. The right patella.

4503. The right tibia.

4504. The right fibula.

4505. The skeleton of the Tiger (*Felis Tigris*).

The vertebral formula is:—7 cervical, 13 dorsal, 7 lumbar, and 3 sacral: there are 22 caudal, but the series is not quite complete. The transverse processes of the last cervical vertebra, consisting of diapophyses only, are imperforate.

Mus. Brookes.

4506. The skull of a male Bengal Tiger (*Felis Tigris*).

The left zygomatic arch and the left frontal sinuses have been fractured. It displays the carnivorous adaptations as strongly as in the skull of the male Lion, No. 4478, which it equals in size; but the nasal bones are relatively longer and extend further back than the nasal processes of the maxillary bones, which are, as it were, truncated. The concavity of the frontal platform between the deflected postorbital processes is narrower than in the Lion; the suborbital foramina are smaller. The longitudinal ridge on the inner and fore part of the base of the crown of the upper canines is more feeble, and subsides sooner than in the Lion.

Hunterian.

4507. The skull of a Bengal Tiger (*Felis Tigris*).

In the length of the nasal bones, the truncation and comparative shortness of the nasal processes of the maxillary bones, in the short extent and feebleness of the antero-internal ridge of the upper canine, and in the narrowness of the median concavity of the interorbital region, this Tiger's skull repeats the characteristics of the preceding.

Hunterian.

4508. The skull of a Bengal Tiger (*Felis Tigris*).

It has been coated with a brownish varnish, and repeats the specific characteristics previously pointed out.

Hunterian.

4509. The skull of a Tiger (*Felis Tigris*). *Hunterian.*

4510. The skull of a Tiger (*Felis Tigris*). *Presented by Colonel Finch.*

4511. The skull of a Tigress (*Felis Tigris*).

The dental system is complete: the roots of the teeth are exposed on the left side of the lower jaw.

Hunterian.

4512. The skull of a Bengal Tiger (*Felis Tigris*).

The right half and the back part of the cranium have been removed, showing part of the bony tentorium, the deep and well-defined sella turcica and Gasserian fossa, the rhinencephalic fossa and the posterior pair of frontal sinuses, into which the superior turbinals do not extend.

Presented by Dr. Henderson.

4513. The skull of a young male Tiger (*Felis Tigris*).

The frontal platform is convex both longitudinally and transversely.

Presented by Sir Stamford Raffles, P.Z.S.

4514. The skull of a Tigress (*Felis Tigris*).

It has been artificially stained of a dark colour to show by contrast the dental system, which is entire. The occipital condyles have been sawed off. The pigment has been removed from the extremities of the left nasal and maxillary bones, to show their form and relative position characteristic of the species.

Presented by Sir William Blizard, F.R.S.

4515. The skull of a Tigress (*Felis Tigris*). *Hunterian.*

4516. The skull of a Tigress (*Felis Tigris*). *Hunterian.*

4517. The cranium of a Tigress (*Felis Tigris*). *Hunterian.*

4518. The cranium of a Tigress (*Felis Tigris*).

The left tympanic and squamosal have been removed, showing the extent of the cerebral cavity closed by the squamosal and its tripartite inner surface; the upper one rough for the broad squamous suture, the anterior and inferior surface smooth and deep for the natiform protuberance of the hemisphere, and the posterior surface smooth and undulated where it is applied to the petrosal capsule, its juncture with which is effected by the medium of the mastoid, which is anchylosed to both.

Hunterian.

4519. The anterior part of the skull of an Albino, or white variety, of the Bengal Tiger (*Felis Tigris*).

The dental series is complete: the left maxillary and nasal bones have been subject to caries; they show the characteristic forms and relations of their posterior extremities; the frontal platform is also narrow and convex.

The head of the recent animal is depicted in the oil-painting, No. 18.

Presented by Sir Everard Home, Bart., V.P.R.S.

The following, to No. 4534 inclusive, are parts of the same skeleton of a Tiger (*Felis Tigris*):—

Hunterian.

4520. The cranium.

4521. The atlas.

4522. The dentata.

4523. A cervical vertebra.

4524. A lumbar vertebra.

4525. The sacrum.

4526. A thoracic rib.

4527. The right scapula.

4528. The right humerus.

4529. The right ulna.

4530. The left radius.

4531. The ossa innominata.

4532. The left femur.

4533. The left tibia.

4534. The right fibula.

4535. Four canines of a Tiger (*Felis Tigris*). *Hunterian.*

4536. A canine, longitudinally bisected, of a Tiger (*Felis Tigris*).

Presented by Sir Everard Home, Bart., V.P.R.S.

4537. The skull of a male Jaguar (*Felis Onca*).

It has been severely fractured over the frontal region, exposing the frontal sinuses, and shows partial healing of the fractures. The nasal process of the maxillary terminates in a point and does not extend so far back as the hinder point of the nasal. The maxillaries

unite with the middle third of the outer border of the nasals. The acoustic bullæ are relatively more expanded than in the Lion or Tiger. The canines do not show the longitudinal grooves which characterize those of the Lion or Tiger.

Purchased.

4538. The skull of a female Jaguar (*Felis Onca*).

The nasal bones show the characteristic breadth and flatness of their upper parts, and they are less bent longitudinally than in the Leopard: the fangs of both upper and lower canines are more rounded, and do not show the longitudinal grooves.

Purchased.

4539. The right upper jaw and both rami of the lower jaw, with a great part of the deciduous dentition, of a young Jaguar (*Felis Onca*).

In the upper jaw the first and second permanent incisors are in place, and the point of the third incisor is beginning to appear: the crown of the permanent canine is exposed on the inner and anterior side of the fang of the deciduous one. The permanent premolar *p* 2 is in place; the permanent *p* 3 is exposed above and on the inner side of the anterior fang of the deciduous carnassial *d* 3, and the permanent carnassial *p* 4 is exposed above the hinder fang of the deciduous carnassial, and above the deciduous tubercular *d* 4, of which it is the proper successor; the permanent tubercular *m* 1 is in place, its development preceding, as usual, that of the premolars. In the right ramus of the lower jaw the base of the deciduous canine and the two deciduous molars are shown in place, and the crown of the permanent carnassial, *m* 1, has cut the gum. The crowns of the permanent canine, of *p* 3 the successor of the first milk-molar, and of *p* 4 the successor of the second milk-molar, and the fangs of *m* 1, are exposed from the inner side. In the left ramus of the same jaw the first and second permanent incisors, the deciduous canine and the two deciduous molars are in place; the permanent third incisor and crown of the permanent canine, and of the premolars *p* 3 and *p* 4, with the fangs of *m* 1, are exposed from the outer side.

Presented by Prof. Owen, F.R.S.

4540. The skull of a large male Panther (*Felis Pardus*).

The nasal bones are more triangular and less flattened than in the Jaguar, and their upper extremities extend further back than the rounded ends of the nasal processes of the maxillaries. The canines have been broken, apparently during the lifetime of the animal.

From Africa.

Purchased.

4541. The skull of a male Leopard (*Felis Leopardus*).

The nasals and maxillaries terminate posteriorly on the same transverse line: the nasals are broader and flatter above their hinder halves than in the skull No. 4542.

Purchased.

4542. The skull of a young Leopard (*Felis Leopardus*).

It shows a state of the dentition comparable with that of the Jaguar No. 4539.

Hunterian.

4543. A vertically and longitudinally bisected and mutilated cranium of a Leopard (*Felis Leopardus*).

It shows the same general characters of the interior of the cranium as that of the Lion, No. 4483. The temporal bone has been removed from the left moiety, showing the extent of the cerebral cavity which is closed by the squamosal in front of the bony tentorium and by the petromastoid behind that part.

Hunterian.

The following, to No. 4559 inclusive, are parts of the same skeleton of a Leopard (*Felis Leopardus*) :—

Purchased.

4544. The skull, in three transverse sections.

The posterior section, as compared with the corresponding one in the Dog (No. 4439), shows the more compact walls of the cranial cavity, the greater breadth of the basioccipital, the greater extent of the bony tentorium, and the greater capacity of the acoustic bullæ. In the middle section may be observed the narrower communication between the meatal compartment of the tympanum and the bulla, the absence of the venous sinus which opens behind the zygomatic arch in the Dog, and the presence of a smaller venous canal, which conveys the blood of the petrosal sinus to the outlet at the middle of the outer side of the bulla: a bristle is passed through this sinus on the left side. The anterior section shows the development of the presphenoidal air-cells in the Leopard, and the extension into them of processes of the turbinals beneath the rhinencephalic chamber: this chamber shows a rudiment of a crista galli at its lower part. In the frontal sinuses exposed above it may be seen the apertures of communication with the superior meatus of the olfactory chamber.

4545. The lower jaw.

4546. The atlas.

4547. The dentata.

4548. A cervical vertebra.

4549. An anterior dorsal vertebra.

4550. The right scapula.

4551. The right humerus.

The inner condyle and the intercondyloid space are both perforated.

4552. The right ulna.

4553. The left radius.

4554. The sacrum.

4555. The ossa innominata.

4556. The left femur.

4557. The right tibia.

4558. The right fibula.

4559. A claw.

4560. The skull of a male of the black variety of the Leopard (*Felis Leopardus*).

The nasal processes of the maxillary are rounded above and do not extend so far back as the points of the nasals. The nasals are narrower in proportion to their length, and are less flat than in the Jaguar. The crowns of the canines show a longitudinal groove on the outer side of their apical half.

Presented by Dr. Henderson.

4561. The skull of a male of the black variety of the Leopard (*Felis Leopardus*).

It presents the same form and disposition of the nasals and nasal processes of the maxillaries as in the foregoing specimen.

Presented by Dr. Henderson.

4562. The skull of the female of the black variety of the Leopard (*Felis Leopardus*).

In this the hinder ends of the nasals are less pointed, and do not extend so far back as the rounded ends of the nasal processes of the maxillaries.

Presented by Dr. Henderson.

The following, to No. 4579 inclusive, are parts of the skeleton of a Puma (*Felis concolor*) :—

Mus. Brookes.

4563. The skull.

It has been fractured across the frontal sinuses, and shows traces of the inflammatory action consequent upon the injury. The nasal bones and premaxillaries are relatively shorter than in the Leopard, and the external nostrils wider. The outer surface of the upper canines has been injured; the groove on the outer side of the lower canines is very short.

4564. The atlas.

4565. The dentata.

4566. Three anterior dorsal vertebræ.

The prozygapophyses are distinct from the metapophyses.

4567. Three posterior dorsal vertebræ.

The metapophyses support part of the articular surface of the prozygapophyses.

4568. Two lumbar vertebræ.

In these, as in the posterior dorsals, the anapophyses are distinct from the metapophyses, but the diapophyses are now lengthened out by connate pleurapophyses.

4569. The sacrum.

It consists of three anchylosed vertebræ.

4570. Two thoracic ribs.

4571. The ossa innominata.

4572. The right patella.

4573. The right tibia.

4574. The right fibula.

4575. The left humerus.

4576. The left radius.

4577. The right ulna.

4578. The left scapula.

4579. The right femur.

4580. The palatal, maxillary and mandibular bones of the Puma (*Felis concolor*).

The deciduous carnassials are retained in the upper and lower jaws.

Hunterian.

4581. The skull of the Cheetah (*Felis jubata*).

The calvarium has been removed. The premolar, *p* 2, is retained, but of extremely small size, on the right side of the upper jaw: it is wanting on the left side of the same jaw. The longitudinal grooves are not present in either the upper or lower canines.

Presented by the Zoological Society of London.

4582. The atlas of the same Cheetah.

The canal for the vertebral artery, after perforating the transverse process, divides; the smaller branch penetrates the middle of the neurapophysis, the larger branch notches the front part of the transverse process, and perforates the fore part of the neurapophysis.

Presented by the Zoological Society of London.

4583. The left carpus and metacarpus, with the distal epiphyses of the radius and ulna, of the Cheetah (*Felis jubata*).

The bones of the carpus are indicated by the following letters:—*s* and *l* are the connate scaphoides and lunare; *cu* is the cuneiforme; *p*, the pisiforme; *t*, the trapezium, which gives an articulation to the ulnar side of the base of the short metacarpus of the pollex; *z*, the trapezoides; *m*, the magnum, which is here the least of the carpal bones; *u*, the unciforme, which supports, as usual, the metacarpals of the fourth and fifth digits. The pisiforme, *p*, projects far backwards, like a small calcaneum: there is a supplementary ossicle wedged in the interspace between the prominent end of the scapho-lunar bone and the proximal end of the metacarpal of the pollex.

Prepared from a specimen which died in the Zoological Gardens of London.

4584. The left tarsus and metatarsus, with the distal epiphyses of the tibia and fibula, of the same Cheetah (*Felis jubata*).

The initial letters indicate the names of the tarsal bones:—*a* is the astragalus; *sc*, the scaphoides; *cl*, the calcaneum; *cb*, the cuboides, which, like the unciforme in the carpus, supports the two outer digits; *ce* is the cuneiforme externum, which, like the magnum, supports the middle digits; *cm* is the cuneiforme medium, which, like the trapezoides, supports the second digit; and *ci* is the cuneiforme internum, which supports the rudiment of the metatarsal of the first or innermost digit.

Prepared from a specimen which died in the Zoological Gardens of London.

4585. The skeleton of a species of *Felis*, about the size of a Leopard.

This is attributed, in the 'Osteological Catalogue' of 1831, p. 63, to a "small Indian Tiger which died in the Menagerie in Exeter Change." The nasal processes of the maxillary are truncated, as in the Tiger, but the difference of size in the skull and teeth seems too great for a mere variety of that species. The canines show a single, faint, longitudinal groove on the outer side. The vertebral formula is:—7 cervical, 13 dorsal, 7 lumbar, 3 sacral, and 23 caudal: and the other characters of the skeleton are conformable to those of the feline genus.

Purchased.

4586. The skull of a species of *Felis* called 'Leopard' in the MSS. memorandum attached; and, therefore, probably a spotted species.

This skull is smaller than that of the Leopard, and is longer and more slender than that of the Cheetah: it is larger than that of the Serval (*Felis Serval*), and has a straighter lower jaw. It is chiefly remarkable for the contraction of the anterior part of the cranium, and for the narrowness of the frontal platform. The nasal processes of the maxillaries are rounded, and terminate on the same transverse line with the nasals: the interposed angles of the frontal are short. The premaxillaries do not reach quite half way up the nasals. The crowns of the

canines are unusually long and slender, the upper ones strongly impressed with the two longitudinal grooves on both the outer and inner sides, and the lower ones with a single groove on the outer side. There is no trace of the small anterior premolar, *p* 2, or its socket, in the upper jaw, so that the molar series is the same in number and kind both above and below.

The animal is said to have been killed at 'Casir,' North Africa.

Purchased.

The following, to No. 4605 inclusive, are parts of the same skeleton of a Lynx (*Felis Lynx*):—

Hunterian.

4587. The cranium.

4588. The lower jaw.

4589. The atlas.

4590. The dentata.

4591. A cervical vertebra.

4592. A dorsal vertebra.

4593. A lumbar vertebra.

4594. The sacrum.

4595. The ossa innominata.

4596. A thoracic rib.

4597. The right scapula.

4598. The left humerus.

4599. The left radius.

4600. The left ulna.

4601. The right femur.

4602. The right tibia.

4603. The right fibula.

4604. The right astragalus.

4605. The right calcaneum.

4606. The skull of a male African Wild Cat (*Felis caffra*).

The nasal process of the superior maxillary is irregularly notched, and extends to the same transverse line as the hinder points of the nasals.

Purchased.

4607. The skeleton of the domestic Cat (*Felis Catus*, var. *domesticus*).

The vertebral formula is :—7 cervical, 13 dorsal, 7 lumbar, 3 sacral, and 21 caudal. The depth of the supraspinal fossa equals that of the infraspinal fossa. The clavicular bones are preserved in this skeleton.

Purchased.

4608. The skeleton of the domestic Cat (*Felis Catus*, var. *domesticus*).

The vertebral formula is :—7 cervical, 13 dorsal, 7 lumbar, 2 sacral, and 22 caudal.

Mus. South.

4609. The cranium, vertically and longitudinally bisected, of the domestic Cat.

In this small species of *Felis*, as in the smaller varieties of *Canis*, the cerebral cavity is proportionally larger, and the jaws shorter, than in the larger species: the orbits are likewise proportionally larger: it retains, in short, more of the fœtal characters. The nasal processes of the maxillary are rounded, and extend to the same transverse line as the points of the nasals. The section shows the extension of the bony tentorium over the fore part of the petrosal to the side of the Gasserian fossa, the extent of the bony septum narium, and the complexity of the turbinals or olfactory capsules.

Hunterian.

4610. The skull of the domestic Cat (*Felis Catus*, var. *domesticus*).

Presented by William Clift, Esq., F.R.S.

4611. The skull of the domestic Cat (*Felis Catus*, var. *domesticus*).

Presented by Henry Cline, Esq.

4612. The skull of the domestic Cat (*Felis Catus*, var. *domesticus*).

Presented by Henry Cline, Esq.

4613. The skull of the domestic Cat (*Felis Catus*, var. *domesticus*).

The bones of the left side of the face have been removed.

Prepared in 1845.

4614. The skull of a young domestic Cat (*Felis Catus*, var. *domesticus*).

Prepared in 1845.

4615. The separated bones of the head of a domestic Cat (*Felis Catus*, var. *domesticus*).

Presented by William Home Clift, Esq.

4616. The reduced caudal vertebræ of the short-tailed variety called 'Manx Cat' (*Felis Catus*, var. *domesticus*). *Presented by Prof. Edward Forbes, F.R.S.*

4617. The reduced caudal vertebræ of the 'Manx Cat' (*Felis Catus*, var. *domesticus*).

Presented by George Bennett, Esq., F.L.S.

Order QUADRUMANA.

Section *STREPSIRHINA.*

Genus *Galeopithecus.*

Dental formula:—$i\,\frac{2-2}{3-3}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{2-2}{2-2}$, $m\,\frac{3-3}{3-3}=34$.

The following, to No. 4630 inclusive, are parts of the same skeleton of the Philippine Colugo, or Flying Lemur (*Galeopithecus philippinensis*):—

Presented by Hugh Cuming, Esq., F.L.S.

4618. The right scapula.

It is remarkable for the long and straight coracoid: the acromion is flattened and expanded: the lower costa is bent out to form a ridge, like a second spine.

4619. The right humerus.

It is long and slender, with a much-produced deltoid ridge commencing between the outer and inner tuberosities, which are subequal and low: the inner condyle and the intercondyloid space are both perforated: the canal for the medullary artery penetrates the back part of the upper third of the shaft and descends obliquely.

4620. The right radius.

It is longer and more slender than the humerus.

4621. The right ulna.

It is still more remarkable for its slenderness, and gradually tapers to a point at the distal end, which does not articulate with the carpus.

4622. The ossa innominata.

The ilium retains the long and slender form characteristic of its essential nature as a pleurapophysis: the divergence of the pubes and ischium, which are also long, occasions an unusually wide 'foramen obturatorium.'

4623. The right femur.

4624. The right tibia.

4625. The right fibula.

This very long and slender bone has an articular expansion at both extremities, the distal one being the largest. The characteristic length of all the long bones relates to the support of the parachute, formed by a wide fold of integument, extending on each side of the body from the fore to the hind extremity.

4626. The left femur, longitudinally bisected.

The medullary cavity is long and wide, and its walls compact.

4627. The left tibia, longitudinally bisected.

It resembles the femur in structure.

4628. The mid-incisor of the lower jaw.

Its crown presents the form of a comb, and is, in this respect, unique in the class *Mammalia.*

4629. A canine of the lower jaw.

It is implanted by two fangs.

4630. Four premolars of the lower jaw.

Genus *Lichanotus.*

Dental formula :— $i\,\frac{2-2}{1-1},\ c\,\frac{1-1}{1-1},\ p\,\frac{2-2}{2-2},\ m\,\frac{3-3}{3-3}=30.$

4631. The skeleton of the Indri Lemur (*Lichanotus Indri*).

The vertebral formula is :—7 cervical, 12 dorsal, 9 lumbar, 4 sacral, and 9 caudal. The atlas has a short hypapophysis, but no neural spine: the transverse process is moderately long and broad and is perforated lengthwise and vertically by the vertebral artery, which afterwards pierces the neural arch. The transverse process is perforated in all the other cervical vertebræ: the pleurapophysial portion of that of the sixth forms a broad lamella directed downwards and outwards : the diapophysial portions, from the second to the seventh cervicals inclusive, are nearly equal in length, and project outwards and backwards. Each of these cervicals has its hypapophysial ridge and neural spine, the latter moderately long and slightly increasing to the seventh. The broad neural arch is fissured behind. The spines of the dorsal vertebræ are continued of equal length throughout that region. The

dorsal diapophyses support each a metapophysial tubercle, which augments as they diminish, and seems to take their place in the eleventh and twelfth vertebræ, the ribs of which have no tubercle. In the twelfth dorsal the metapophysis projects from above the prozygapophysis, and is continued backwards upon a well-developed anapophysis, which commences at once in that vertebra and continues to be developed, although decreasing in length, to the penultimate lumbar inclusive. The metapophyses, which are prominent in the anterior lumbar vertebræ, gradually subside as these approach the sacrum. The diapophysis has a low rough tubercle on the first lumbar, which is developed into a depressed plate increasing in length and breadth as the succeeding lumbars approach the sacrum. Eight pairs of ribs directly join the sternum, which consists of seven bones and an ensiform cartilage. The cranium has a short paroccipital, and a shorter mastoid which coalesces with the base of a large petrosal bulla. The squamosal is perforated by a venous foramen anterior to the auditory meatus. The malar extends backwards almost to the glenoid cavity. The orbits are separated by a moderately broad and convex part of the frontal, swollen by large air-cells: the orbits communicate freely with the temporal fossæ. The premaxillaries are divided anteriorly by an angular cleft separating in the same degree the anterior or mid-incisors from each other. The lower canines are recognizable, by their relative position to the upper canines, from the contiguous procumbent inferior pair of incisors, which they considerably exceed in size. The lower jaw is remarkable for the great production of its broad and rounded angle: the back part of its symphysis is also unusually produced. The scapula is remarkable for the length and strength of its coracoid process. The humerus is perforated above the inner condyle, but not between the condyles. The interosseous space is considerable between the long and slender radius and the more slender ulna. The scaphoid bone is more produced forwards than the unciforme. The ilium has a strong tubercular process above the acetabulum. The femur is so long as to equal in length seventeen vertebræ of the trunk, measured from the first dorsal backwards. The fore part of both the astragalus and calcaneum is unusually produced.

In the skeleton of the Indri in the Zootomical Museum at the Garden of Plants a short rib is attached to the sides of the vertebra answering to the first lumbar in the present skeleton.

From Madagascar.

Purchased.

Genus *Stenops*.

Dental formula:—$i\,\frac{2-2}{2-2}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{3-3}{3-3}$, $m\,\frac{3-3}{3-3}=36$.

4632. The skeleton of a Slender Lemur (*Stenops gracilis*).

The vertebral formula is:—7 cervical, 14 dorsal, 9 lumbar, 3 sacral, and 6 caudal. The lumbar vertebræ slightly decrease in size as they approach the sacrum. Ten pairs of ribs articulate directly with the sternum, which consists of nine bones and an ensiform cartilage. The humerus is perforated between the condyles and above the inner condyle. The inner digit is opposed to the rest in both fore and hind feet.

Hunterian.

4633. The skeleton of a Slender Lemur (*Stenops gracilis*).

The vertebral formula is :—7 cervical, 14 dorsal, 9 lumbar, 3 sacral : the caudal vertebræ are wanting. The first lumbar vertebra differs from that in the preceding skeleton in having a pair of long and slender processes formed, apparently, by anchylosed rudiments of a fifteenth pair of ribs. The transverse processes of the succeeding lumbars consist of short diapophyses : the transverse processes of all the cervical vertebræ are perforated. A metapophysial tubercle is developed upon the diapophysis in each of the twelve anterior dorsal vertebræ ; in the thirteenth it takes the place of the diapophysis, and in the fourteenth it extends forwards and presents an articular surface for the outer side of the posterior zygapophysis : it has the same disposition and connections throughout the lumbar series, where the diapophyses are serial repetitions of the base supporting the anchylosed rib in the first lumbar vertebra. The most remarkable feature in the cranium is the expanded frame of the orbits, which are closely approximated above the nasal bones ; they, however, communicate by wide apertures with the temporal fossæ. The nasals overhang the premaxillaries, the most produced part of which forms the lower boundary of the external nostril, from which the premaxillaries slope downwards and backwards to the incisive alveoli, which are extremely minute. The temporal ridges are widely separated along the upper part of the cranium, where the coronal and fronto-sagittal sutures intersect each other at right angles. All the cranial sutures are like harmoniæ. The humerus is perforated above the inner condyle, and has a wide intercondyloid vacuity. The iliac bones are long, slender, and extended almost in the same line with the sacrum. The pubic bones meet at an acute angle, and form a very short symphysis. There is a small ossified patella. The feeble development of the vertebræ in the long lumbar region, the small sacrum and contracted pelvis, are points of resemblance with the Bat-tribe ; and, together with the long and slender bones of the extremities, relate to the slow movements of this climbing quadruped. The capacious orbits relate to its nocturnal habits.

Purchased.

4634. The skull, wanting the left malar bone, of the Slow Lemur (*Stenops tardigradus*).

The orbits are less closely approximate than in the *Stenops gracilis*, and the anterior surface of the small premaxillaries is more nearly vertical. The vomer divides the nostrils to their posterior apertures, as in *Stenops gracilis*.

Hunterian.

Genus *Lemur*.

Dental formula :—$i\,\frac{2-2}{2-2},\ c\,\frac{1-1}{1-1},\ p\,\frac{3-3}{3-3},\ m\,\frac{3-3}{3-3}=36.$

4635. The skeleton of the Black-fronted Lemur (*Lemur nigrifrons*).

The vertebral formula is :—7 cervical, 12 dorsal, 7 lumbar, 3 sacral, and 21 caudal. The transverse process of the atlas is perforated lengthwise and vertically, by the vertebral artery, which afterwards pierces the neural arch. The transverse processes of the last cervical are

imperforate, consisting only of the diapophysis; that on the right side has the rudiment of a rib attached to it. A broad pleurapophysial plate extends outwards from below the diapophysis of the sixth cervical. The spines of the third to the sixth cervicals inclusive are very small. The metapophysis begins to be developed in the middle dorsal vertebræ, and, in the tenth, projects above, but distinct from, the diapophysis. In the eleventh the diapophyses have disappeared, and the metapophysis is on the outside of the prozygapophysis. From this vertebra a well-marked anapophysis is developed, which is continued from all the succeeding vertebræ. The diapophysis reappears upon the first lumbar, and increases in length and breadth as the other lumbar vertebræ approach the sacrum. The centre of motion of the back is indicated by the vertical spine of the tenth dorsal vertebra, towards which those of the other dorsal and of the lumbar vertebræ incline. Seven pairs of ribs directly join the sternum, which consists of seven bones. Both coracoid and acromial processes are nearly equally developed. The humerus is perforated above the inner condyle, but not between the condyles. The patellæ are well developed; and two small fabellæ are preserved behind the condyles of the left femur.

The sutures of the cranium are nearly obliterated. The paroccipitals are absent, and the root of the zygoma is pierced by a venous foramen. There are large petrotympanic bullæ. The rim of the orbit is entire, but the cavity communicates freely with the temporal fossæ.

Purchased.

4636. The skeleton of the *Lemur nigrifrons.*

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, 3 sacral, and 27 caudal. In both these skeletons the fore part of the maxillaries at the sides of the nostrils has been diseased.

Mus. Brookes.

4637. The skull of the *Lemur nigrifrons.*

The teeth have been removed from the left side of both upper and lower jaws, and are separately displayed.

Hunterian.

4638. The skeleton of the White-fronted Lemur (*Lemur albifrons*).

The vertebral formula is:—7 cervical, 13 lumbar, 3 sacral; of the caudal 18 remain. Nine pairs of ribs directly join the sternum, which consists of eight bones.

Mus. Brookes.

4639. The skull of the White-fronted Lemur (*Lemur albifrons*).

The upper canines are unusually developed and recurved.

Hunterian.

4640. The skull of the Ring-tailed Lemur (*Lemur Catta*). *Mus. Brit.*

The following, to No. 4651 inclusive, are parts of the same skeleton of the Lemur (*Lemur Catta*) :—

Hunterian.

4641. The cranium.

4642. The rami of the lower jaw.

4643. The atlas.

4644. The fifth cervical vertebra.

4645. The sixth and seventh cervical vertebræ.

They show the large pleurapophysial plates of the transverse processes of the sixth, and the simple diapophysial, imperforate, transverse processes of the seventh vertebra.

4646. The thirteen dorsal and six lumbar vertebræ.

Eight pairs of ribs directly join the sternum, which consists of seven bones: the fifth and sixth of these have coalesced. The transverse processes of the tenth dorsal divide into diapophysial, metapophysial, and anapophysial portions; the two latter are retained as distinct processes in the eleventh and succeeding dorsals. The diapophysis reappears as a distinct process upon the first lumbar.

4647. The pelvis, with the first and second caudal vertebræ.

The symphysis pubis is ossified. The ilium has an epicotyloid ridge.

4648. The scapula and clavicle.

4649. The right humerus, showing the epicondyloid foramen.

4650. The right radius, ulna, and bones of the hand.

4651. The natural skeleton of the bones of the left lower extremity.

The fabella is preserved attached to the capsule of the knee-joint behind the external semilunar cartilage.

The following, to No. 4657 inclusive, are sections of parts of the same skeleton of a *Lemur*:—

Hunterian.

4652. The vertically and longitudinally bisected cranium.

4653. The right humerus, longitudinally bisected.

4654. The right radius, longitudinally bisected.

4655. The right ulna, longitudinally bisected.

4656. The right femur, longitudinally bisected.

4657. The right tibia, longitudinally bisected.

4658. The cranium of a *Lemur*.

The left palatal, maxillary, premaxillary, and both nasal bones have been removed to show the extent of the vomer and the simple form of the superior turbinals. The left squamosal has been removed to show the small extent of the cranial cavity, which it closes; the articulation of the alisphenoid with the parietal; and the termination of that division of the lateral sinus which opens outwardly by the postzygomatic foramen.

Presented by Prof. Owen, F.R.S.

4659. The cranium of a *Lemur*.

It has been transversely bisected through the petrosal bullæ.

Presented by Prof. Owen, F.R.S.

4660. The separate bones of the cranium of a young *Lemur Catta*. *Purchased.*

4661. The skull of the Ruffed-Lemur (*Lemur Macaco*).

The cranial cavity is exposed by a section of the calvarium. The sockets of the teeth of the left side are laid open. The petrosal has a large and very deep cerebellar fossa: a short tentorial ridge projects anterior to this. There is a low postclinoid ridge. The lateral sinus pierces the petrosal where it joins the parietal and meets a second venous channel traversing the middle fossa of the cranium to terminate at the postglenoid foramen. The foramen ovale is a small fissure between the petrosal and alisphenoid less than the foramen rotundum, which is close to the foramen lacerum anterius: the outlet of the foramen ovale is in the Eustachian fossa.

Purchased.

4662. The naturally articulated bones of the thorax, with six cervical and two lumbar vertebræ, of a *Lemur*.

In this specimen the dorsal vertebræ are twelve in number, the thirteenth from the neck being unequivocally a lumbar vertebra with short, broad, depressed diapophyses. The

division of the transverse process into met-, di-, and an-apophyses is well shown in the tenth dorsal with the vertical spine; in the succeeding vertebræ these processes are distinct and remote. Eight pairs of ribs directly articulate with the sternum, which consists of six bones and an ensiform cartilage. The transverse processes of the last cervical are not perforated.

Hunterian.

Section *PLATYRHINA.*

Genus *Hapale.*

Dental formula:—$i\,\frac{2-2}{2-2}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{3-3}{3-3}$, $m\,\frac{2-2}{2-2}=32$.

4663. The skeleton of a male Jacchus Monkey (*Hapale Jacchus*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 3 sacral, and 19 caudal. The transverse process of the atlas is perforated lengthwise and vertically by the vertebral artery, which afterwards perforates the neural arch. The bodies of the succeeding cervicals are produced posteriorly into a convex prominence which fits into a concavity on the fore part of the centrum behind. The transverse processes of the third to the sixth cervical inclusive bifurcate, the pleurapophysial division increasing in breadth and length to the sixth: the transverse process of the last cervical is imperforate, consisting only of a slender diapophysis. Eight pairs of ribs directly articulate with the sternum, which consists of seven bones. The accessory tubercle appears upon the middle dorsal vertebra; it divides into met- and anapophyses on the tenth dorsal, where a diapophysial prominence still articulates with the tubercle of the rib. The diapophysis disappears in the succeeding dorsals in which the met- and an-apophyses become distinct and remote, with progressive increase of size. The diapophysis reappears in the first lumbar as a short depressed process, and increases in length and breadth to the penultimate lumbar. In this vertebra the anapophysis becomes much shorter, and almost disappears in the last lumbar. The coracoid process of the scapula sends a short process backwards. The humerus is not perforated either above or between the condyles. The ungual phalanges are compressed and falcate, and the pollex is on a line with the rest of the digits of the fore-limb, not opposed to them. In the hind-limb the ungual phalanx of the hallux is depressed for the support of a nail, and it is opposed as a thumb to the other digits which have falcated ungual phalanges. The ilium is long and narrow, with a supra-cotyloid ridge. The orbits do not communicate with the temporal fossæ.

Purchased.

4664. The skeleton of a female *Hapale Jacchus.*

It repeats the characters noticed in the preceding, except that the second sacral vertebra is broader.

Purchased.

4665. An imperfect skeleton of the *Hapale Jacchus.* *Mus. South.*

Genus *Callithrix*.

Dental formula:—$i\,\frac{2-2}{2-2}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{3-3}{3-3}$, $m\,\frac{3-3}{3-3}=36$.

4666. The skeleton of a male Marmoset, or Squirrel-Monkey (*Callithrix sciureus*).

The vertebral formula is:—7 cervical, 13 dorsal, 7 lumbar, 3 sacral, and 24 caudal. The transverse process of the atlas is perforated lengthwise and vertically by the vertebral artery, which afterwards pierces the neural arch: those of the fourth to the sixth cervicals inclusive bifurcate, the pleurapophysial portion increasing in breadth and length to the sixth: the transverse process of the seventh cervical consists of the diapophysis only and is imperforate. The tubercle above the diapophysis divides into met- and an-apophyses upon the ninth dorsal vertebra; in the tenth these processes diverge; they become quite distinct in the eleventh, and increase in length to the fifth lumbar vertebra. The anapophysis is suppressed in the last lumbar. There is a ridge upon the angle of the coracoid. The humerus is pierced above the inner condyle. The pollex is partially opposed in the hand, and the corresponding digit forms a more complete thumb in the foot.

Mus. Brookes.

4667. The skeleton of a female Marmoset (*Callithrix sciureus*).

The sacrum is broader, especially at the third vertebra.

Presented by Henry Cline, Esq.

4668. An imperfect skeleton of the Marmoset (*Callithrix sciureus*).

A pair of hypapophyses is developed from the fore part of the sixth and succeeding caudal vertebræ as far as the sixteenth, beyond which they are represented by a single tubercle. Hæmapophyses are articulated to most of these inferior processes, and form a complete arch towards the base of the tail.

Mus. South.

4669. The skull of a Marmoset (*Callithrix sciureus*).

It shows the complete dental formula on the left side, which, agreeing in number and kind with that of the Lemur, well illustrates the true homology of the inferior procumbent canines in that genus. The orbits do not communicate with the temporal fossæ. There are no parapophyses, and only a feeble mastoid ridge. The petrosals are slightly swollen. The superoccipital has two large depressions. The parietals articulate with the malars. There is a postglenoid venous foramen.

Purchased.

Genus *Cebus*.

Dental formula:—$i\,\frac{2-2}{2-2}$, $c\,\frac{1-1}{1-1}$, $p\,\frac{3-3}{3-3}$, $m\,\frac{3-3}{3-3}=36$.

4670. The skeleton of a Capuchin Monkey (*Cebus capucinus*).

The vertebral formula is:—7 cervical, 13 dorsal, 6 lumbar, 3 sacral, and 23 caudal. The transverse process of the atlas is perforated lengthwise by the vertebral artery, which afterwards perforates the neural arch: in the third, fourth and fifth cervicals, the transverse processes have short but antero-posteriorly extended pleurapophysial ridges: those in the sixth vertebra are developed into broad and long plates projecting downwards and outwards. The simple diapophyses of the seventh cervical are imperforate. The concavo-convex articulations of the bodies of the ninth cervical vertebræ are repeated in this genus. The tubercles representing met- and an-apophyses project distinctly, the one from the fore part, the other from the back part, of the diapophysis of the fifth dorsal: they progressively increase in size and become quite distinct in the thirteenth dorsal, in which the metapophysis has risen upon the anterior zygapophysis. The anapophyses continue to be developed to the penultimate lumbar. The diapophyses progressively increase in length from the first to the last lumbar vertebræ. Hæmal arches are articulated to the inferior interspaces of the six anterior caudals, and are supported by distinct hypapophyses from the fourth caudal, which processes continue to be developed after the hæmapophyses have ceased to be so. Nine pairs of ribs articulate directly with the sternum, which consists of seven bones and an ensiform cartilage. The humerus is perforated above the inner condyle. The pollex is partially, the hallux wholly, opposed to the other digits of their respective limbs. The fabellæ are preserved, one behind each condyle, in both femora.

Presented by John Gunning, Esq.

4671. The skeleton of a Capuchin Monkey (*Cebus capucinus*).

The vertebral formula is the same in this as in the preceding skeleton, except that the ribs of the thirteenth dorsal have either not been preserved or have not been developed. The diapophyses of the first lumbar appear to have been increased by an anchylosed rudiment of a rib, which curves slightly backwards. The neural spine of the eleventh dorsal is that towards which the spines of the other trunk-vertebræ converge. Nine pairs of ribs directly articulate with the sternum. The fabellæ have been preserved behind the right femur. There are five hæmal arches beneath the base of the tail.

Presented by William Home Clift, Esq.

4672. The skeleton of a young *Cebus*.

The vertebral formula is:—7 cervical, 14 dorsal, 5 lumbar, 3 sacral, and 25 caudal. The diapophyses of the first lumbar show a surface for the articulation of a rudimental rib, which has become detached. The humerus is perforated both between the condyles and above the inner eondyle.

Purchased.

4673. The skull of a *Cebus*.

There are neither parapophyses nor mastoids. The petrosals form slightly swollen convexities. There is a small postglenoid venous foramen, and a second at the end of the squamosal suture. The superoccipital plate has two large depressions. The parietals articulate with the malars. The dental series is entire.

Hunterian.

4674. The cranium of a *Cebus*, of larger size and with larger canines, and in which the frontal is more prolonged between the parietals. The calvarium has been detached, and exposes the cranial cavity.

The petrosal has a large and deep cerebellar fossa. The tentorial margin of the petrosal is sharp and slightly produced. A division of the lateral sinus excavates the sutural base of the petrosal to terminate at the postglenoid fossa. The postclinoid plate is more developed than in the Lemur. The rhinencephalic fossa is much smaller, and the orbital cavities form a much greater prominence in the cranial cavity than in the Lemur. The foramen ovale is between the petrosal and alisphenoid, and is larger than the foramen rotundum, which is midway between it and the foramen lacerum anterius. The apex of the frontal is partially detached as a Wormian bone.

Mus. Brit.

4675. The skull of a *Cebus*, with the permanent dentition complete.

The small size of the hinder true molars is worthy of notice, since these are the teeth which are not developed in the genus *Hapale*.

Presented by Henry Cline, Esq.

4676. The separated bones of the head of a *Cebus*.

The sphenoid has no foramen ovale or foramen spinosum. The temporal differs from that in the Catarhine or Old-World Monkeys by the course of the lateral sinus to the postglenoid venous foramen.

Presented by Prof. Owen, F.R.S.

The following, to No. 4679 inclusive, are parts of the same skeleton :—

Hunterian.

4677. The bones of the trunk, with the scapular arch, of a *Cebus*.

The vertebral formula is :—7 cervical, 14 dorsal, 6 lumbar, 3 sacral, and 24 caudal. The diapophysis is represented by a ridge or tubercle from the under part of the anapophysis in the three last dorsal vertebræ: it projects as a distinct and large process from the lumbar vertebræ.

4678. The bones of the upper extremities.

The internal condyle of both humeri is perforated.

4679. The ossa innominata and bones of the lower extremities.

The fabellæ are not preserved.

The following, to No. 4686 inclusive, are parts of the same skeleton of a young *Cebus*:—

Hunterian.

4680. The skull.

The deciduous molars and the first and second true molars are in place. The germs of the three premolars are exposed on the right side of both upper and lower jaws.

4681. The vertebræ of the trunk.

The vertebral formula is:—7 cervical, 14 dorsal, 6 lumbar, 3 sacral, and 24 caudal. Nine pairs of ribs directly join the sternum, which consists of seven bones. The hæmal arches begin to be developed at the interspace of the third and fourth caudal vertebræ. Rudimental hæmapophyses are articulated to the hypapophyses of the eighth anterior caudal vertebræ, and these latter processes alone are present at the lower part of the centrum of the succeeding caudals.

4682. The right humerus.

The proximal epiphysis is unanchylosed, and the inner condyle is perforated.

4683. The bones of the right fore-arm and hand.

The distal epiphyses of both radius and ulna are unanchylosed. The scaphoid is divided, and there is a supernumerary sesamoid ossicle wedged between its inner division and the trapezium.

4684. The right femur.

The epiphyses are still unanchylosed at both extremities. The fabellæ are preserved behind the condyles.

4685. The right tibia and patella.

The epiphyses are distinct at both extremities.

4686. The right fibula and bones of the hind foot.

A sesamoid is wedged between the entocuneiform and metatarsal of the hallux. A pair of sesamoids are developed beneath the proximal joints of each of the digits, and a single sesamoid beneath the last joint of the hallux.

Genus *Ateles.*

Dental formula:—$i\,\frac{2-2}{2-2},\ c\,\frac{1-1}{1-1},\ p\,\frac{3-3}{3-3},\ m\,\frac{3-3}{3-3}=36.$

4687. The skeleton of the Marimonda or White-bodied Spider-Monkey (*Ateles Belzebuth*).

The vertebral formula is:—7 cervical, 14 dorsal, 4 lumbar, 3 sacral, and 31 caudal. The transverse process of the atlas is perforated lengthwise by the vertebral artery, which afterwards perforates the neural arch: that of the fourth, fifth and sixth cervicals has a progressively increasing pleurapophysial plate: that of the seventh consists of the diapophysis only, and is imperforate. The atlas has a hypapophysial ridge, and the axis shows a corresponding tubercle. The centrum of the succeeding cervicals is produced backwards into a convex form. The tuberosity above the dorsal diapophyses becomes a ridge in the eleventh dorsal, which is produced forwards into an angular metapophysis: in the thirteenth dorsal it is produced to the same extent backward into an anapophysis: in the fourteenth dorsal these processes are distinct and well-developed, but the diapophysis has disappeared. The anapophysis is developed from the first and second lumbar vertebræ, and the diapophysis from all the lumbars, progressively increasing to the penultimate one. A pair of hypapophyses begin to be developed from the fifth caudal, and increase in size in the sixth and seventh. The hæmal arch is anchylosed to these processes in the eighth and ninth caudals, but the hypapophyses continue to be developed, without the addition of that arch, throughout the succeeding caudal vertebræ. The anterior zygapophyses disappear in the ninth caudal, but the metapophyses which support them in the preceding caudals continue to be developed to near the end of the tail. The diapophyses are single on each side in the seven anterior caudals, but are divided into an anterior and posterior portion on each side of the vertebræ throughout the rest of the tail. The fourteenth pair of ribs is wanting in this skeleton: nine pairs of ribs articulate directly with the sternum, which consists of eight bones and an ensiform cartilage. The long and large coracoid has an angular tuberosity. The humerus is not perforated either above or between the condyles. This bone, and, still more, the radius and ulna, are remarkable for their length and slenderness, as are also the bones of the digits, with the exception of the pollex, which is reduced to a rudiment of its metacarpus, and is concealed beneath the skin in the recent animal.

The femur, tibia and fibula, are also longer, but the tibia is not attenuated in the same proportion. The thumb of the hind foot is complete and well-developed. The prehensile tail compensates for the loss of that quality in the hand.

Mus. Brookes.

4688. The skeleton of the Yellow Spider-Monkey (*Ateles arachnoides*).

The vertebral formula is:—7 cervical, 14 dorsal, 4 lumbar, 3 sacral, and 32 caudal. Fourteen pairs of ribs are preserved. The left femur shows a united fracture, and is half an inch shorter than the other.

Mus. Brookes.

4689. The skull of an immature Spider-Monkey (*Ateles*).

The permanent canines and last true molars have not come into place. The paroccipitals and mastoids form rough tubercles, but do not extend downwards as processes. The carotid arteries perforate the back part of the petrosals. There is a venous foramen at the suture between the squamosal and alisphenoid. The vomer extends to the posterior nares. The incisive foramen is large and single.

Hunterian.

4690. The skeleton of a Spider-Monkey (*Ateles paniscus*).

The vertebral formula is:—7 cervical, 13 dorsal, 4 lumbar, 3 sacral, and 30 caudal, but the latter series is incomplete. The postzygapophyses of the thirteenth dorsal indicate, by the inexactness of their adaptation to the prozygapophysis of the next vertebra, that one may be omitted in this artificially articulated skeleton. The humerus is imperforate at its distal end.

Mus. South.

The following, to No. 4716 inclusive, are parts of the same skeleton of a Spider-Monkey (*Ateles paniscus*):—

Hunterian.

4691. The cranium, with the calvarium detached.

It shows the same venous foramen formed by the meeting of two converging sinuses between the squamosal and alisphenoid. Ossification has extended into one half of the tentorium. The cerebellar fossa in the petrosal is of great depth. The foramen ovale is formed by the petrosal and alisphenoid.

4692. The lower jaw.

The symphysis is completely anchylosed, and the angle of the jaw rounded off. The condyles and small coronoid processes are of equal height.

4693. The atlas.

The transverse process is perforated vertically, and the neural arch transversely, by the vertebral artery.

4694. The axis.

The pleurapophysial ridge of the transverse process is produced obliquely downwards. The neural spine is well developed, and supports upon its upper surface a vertical ridge.

4695. The third to the sixth cervical vertebræ inclusive.

They show the anterior concavity and posterior convexity of the articular ends of the centrums in the transverse direction, and their anterior convexity and posterior concavity in the

vertical direction, producing an interlocking joint, combining strength with freedom of motion, and analogous to that in the neck of birds. The pleurapophysial part of each transverse process is a broad depressed plate, with its anterior margin produced, and progressively increasing in size from the third to the sixth vertebra. A similar increase is presented by the neural spines, especially in the sixth vertebra.

4696. The seventh cervical vertebra.

The transverse processes are simple diapophyses, and imperforate.

4697. The fourteen dorsal and three lumbar vertebræ.

The pleurapophyses are distinct from the diapophyses, are long and free, forming ribs. Nine pairs of these directly articulate with the sternum, which consists of nine bones and an ensiform cartilage. The metapophyses begin to curve inwards from the second dorsal vertebra, assume the form of a distinct plate in the tenth and eleventh, and separate from the anapophyses in the thirteenth and fourteenth vertebræ. The first lumbar has no diapophyses, but shows an articular surface for a pair of rudimental ribs. Broad, depressed diapophyses are developed from the second and third lumbars. The anapophyses are suppressed on the latter.

4698. The sacrum and five anterior caudal vertebræ.

The sacrum includes four vertebræ by the anchylosis of the last lumbar, which is modified and developed for articulation with the iliac bones. Tubercles analogous to metapophyses and representing a second series of those processes are developed from the diapophyses of the caudal vertebræ.

4699. The four succeeding caudal vertebræ.

They show the development of a pair of hypapophyses from the seventh, and the superaddition and anchylosis of a hæmal arch to those of the two succeeding caudals, in which the diapophysis is divided into an anterior and posterior portion. The neural canal becomes exposed in the ninth vertebra.

4700. The four succeeding caudal vertebræ, being the tenth to the thirteenth inclusive.

They show the great length of the hypapophyses, to which hæmapophyses have not been attached. The anterior zygapophyses cease to be developed from the metapophyses in these and the following caudal vertebræ.

4701. The eighteen succeeding caudal vertebræ.

In these all trace of the neural arch has disappeared, but the metapophyses, hypapophyses, anterior and posterior diapophyses, and the posterior zygapophyses continue to be developed to near the end of the tail, where they gradually subside to mere tubercles and finally disappear.

4702. The right scapula.

The angular tuberosity of the coracoid has joined the superior costa of the scapula circumscribing the suprascapular notch.

4703. The right clavicle.

4704. The right humerus.

There is no perforation either above or between the condyles.

4705. The right radius.

4706. The right ulna.

It has lost its lower epiphysis.

4707. The right os innominatum.

4708. The right femur.

4709. The right tibia.

4710. The right fibula.

4711. The right tarsal and metatarsal bones.

The inner border of the navicular bone is much produced.

4712. The left radius, longitudinally bisected.

4713. The left ulna, longitudinally bisected.

4714. The left femur, longitudinally bisected.

4715. The left tibia, longitudinally bisected.

4716. The left fibula, longitudinally bisected.

4717. Portions of the upper and lower jaws of a Spider-Monkey (*Ateles*).

The whole of the permanent dentition is included in the lower jaw, and the mode of implantation of these teeth is exhibited on the right side of both jaws.

Presented by Prof. Owen, F.R.S.

Genus *Mycetes.*

Dental formula:—$i\,\frac{2-2}{2-2}$, $c\,\frac{1-1}{1-1}$, $p\frac{3-3}{3-3}$, $m\,\frac{3-3}{3-3}=36$.

4718. The skull of the Red Howling-Monkey (*Mycetes seniculus*).

The dentition is entire. An obtuse paroccipital ridge extends from the condyle to the mastoid ridge. The precondyloid, jugular, and carotid foramina all open into an irregular fossa between the petrosal and paroccipital ridge. There is a small venous foramen outside the mastoid, and a second at the anterior border of the squamosal. The superoccipital region is almost flat and vertical, at right angles with the parietal surface, from which it is separated by a well-defined ridge. The suture between the frontals and that between these and the nasals are obliterated, together with the coronal sutures. The maxillo-premaxillary sutures remain, and demonstrate the junction of the premaxillaries with the nasals. The chief feature of peculiarity in the skull of the Howler is the extraordinary depth of the mandibular rami, especially of their angular and ascending portions. This development relates to the protection and support of the still more extraordinarily developed hyoidean and laryngeal apparatus—the organs of the loud and dissonant cries which have procured for these South American Monkeys their common name. The superior length of the postglenoid process, in relation to the larger and heavier lower jaw, is worthy of notice. The ectopterygoids much exceed the entopterygoid plates in size.

Mus. Langstaff.

Section *CATARHINA.*

The following dental formula obtains throughout the whole of this group:—

$$i\,\frac{2-2}{2-2},\ c\,\frac{1-1}{1-1},\ p\,\frac{2-2}{2-2},\ m\,\frac{3-3}{3-3}=32.$$

(With a narrow sternum.)

Genus *Papio.*

4719. The skeleton of a male Mandrill (*Papio Mormon*).

The vertebral formula is:—7 cervical, 12 dorsal, 6 lumbar, 4 sacral: there are 9 caudal, but one or two may be wanting. The transverse process of the atlas is perforated lengthwise

and vertically by the vertebral artery which afterwards pierces the neural arch: the neural spine is represented by a small tubercle, and there is a hypapophysial ridge. The centrum of the axis is much produced backwards, underlapping that of the third vertebra: this character is gradually lost in the succeeding vertebræ: the transverse process of the axis ends in two tubercles. The lower (pleurapophysial) division of the process is compressed in the third cervical and becomes developed into a plate, progressively increasing, and disproportionately so in the sixth cervical: it is absent in the seventh cervical, the transverse process of which is, however, still perforated by the vertebral artery. The neural spines are simple, and increase in length from the third to the seventh cervicals. Those of the dorsal vertebræ are longer and stronger, but diminish in length as they approach the loins. An anapophysial tubercle is developed from the diapophysis of each dorsal vertebra, increasing in length to the two last, in which it has an independent origin. The metapophysis is suddenly developed from the tenth dorsal, and presents an articular surface to a second facet on the outer side of the hinder zygapophysis of the vertebra in front. The anapophyses continue to be developed from all the lumbar vertebræ, progressively decreasing as these approach the sacrum, and appearing in the last as a mere ridge on the upper part of the base of the diapophysis. The homotypal ridge may be recognized on the first sacral vertebra. There are rudiments of hypapophyses on the middle caudal vertebræ. Seven pairs of ribs articulate directly with the sternum, which consists of seven bones and an ensiform cartilage. The coracoid has an angular ridge, but is much less developed than in the Platyrhine, or New-World Monkeys. The humerus is imperforate at its distal extremity. The scaphoid is divided in the carpus. There is an accessory ossicle between the cuboid and fifth metatarsal.

Mus. Brookes.

4720. The skeleton of a Mandrill (*Papio Mormon*).

The vertebral formula is:—7 cervical, 12 dorsal, 6 lumbar, and 3 sacral: the caudal series is incomplete. Rudiments of metapophyses are present on four of the dorsal vertebræ anterior to the eleventh, in which the development of the metapophysis is suddenly increased with the articular surface for the posterior zygapophysis on the tenth dorsal.

Purchased.

4721. The skull of a young Mandrill (*Papio Mormon*).

The last true molars and the upper canines have not come into place. The crown of the left upper canine is exposed.

Hunterian.

4722. The skull of a young female Drill (*Papio Anubis*).

It shows the sexual inferiority in the size of the canines. The teeth have been removed from the right side of both upper and lower jaws, and are separately displayed. The lower canines and premolars have cut the gum; those of the upper jaw are still concealed in the substance of the bone. The last true molars are concealed in both jaws.

Hunterian.

The following, to No. 4746 inclusive, are parts of the same skeleton of the Black-faced Drill (*Papio porcarius*) :—

Hunterian.

4723. The cranium.

There is a slight paroccipital prominence; that of the mastoid is rather more developed. The jugular fossa is distinct from the precondyloid and carotid foramina. There is a rudimental vaginal proccss outside the latter. The petrosal bifurcates anteriorly into an eustachian and an apical process; the latter underlaps the base of the pterygoid process, and the inner surface of the petrosal is closely applied to the basisphenoid and basioccipital as far as the foramen jugulare. There is, therefore, no 'foramen lacerum basis cranii.' The superoccipital surface is almost flat, and slopes from the great foramen upwards and backwards, forming an acute angle with the parietal surface, although the present cranium is not only of a mature but of an aged individual. The temporal ridges are separated by nearly an inch at the occipital ridge, wherc they most approximate each other: the sagittal and coronal sutures are retained in the intermediate tract of the calvarium. The squamosal is perforated near its middle by one or two small venous foramina, but there are no postglenoid outlets of the lateral sinuses. The foramen ovale opens externally between the petrosal and alisphenoid, and the nerve which it transmits afterwards pierces the base of the broad and backwardly extended ectopterygoid: the entopterygoid plate is comparatively small, but ends in a hamular process. The glenoid articular surface projects from the under part of the base of the zygoma and is slightly convex: it is defended by a postglenoid process. The vomer divides the posterior nostrils, and there is a venous sinus or foramen between its base and the presphenoid. The facial part of the skull of this bestial quadrumane repeats the general characteristics of that of the *Papio Mormon*, but the coalesced nasals are more prominent, and gradually expand as they advance forwards: they unite with a smaller proportion of the premaxillaries. The fossæ between the nasals and maxillary tuberosities are shorter and wider, and the tuberosities themselves are much shorter in proportion to their breadth, and are likewise more rugose. The canines are relatively less, and their anterior groove is deeper. The anterior fang of the first premolar of thc upper jaw is less oblique and less developed than in the *Papio Mormon*. The under jaw, like the maxillary part of the skull, is smaller than in the *Papio Mormon*. There is a tubercle at the base of the fissure between the two principal external lobes of the second and third lower molars. The pterygoid fossæ are larger and deeper in the *Papio Mormon*, and the third division of the trigeminal nervc grooves the base of the left ectopterygoid, and does not so directly perforate that of the right as it does in the *Papio porcarius*. There is no postvomerine foramen in the *Papio Mormon* compared. The alisphenoid joins the frontal, and is separated by the squamosal from the parietal. The calvarium is detached, showing the two tables and diploë of the skull, except at the superoccipital where the diploë is obliterated. The upper angle of the mastoid may be observed wedged in between the superoccipital and parietal. The limits of the interparietal may be traced upon the inner surface of the calvarium. There is a shallow cerebellar fossa above the meatus internus: the cochlear lamella extends nearer to the commencement of this meatus than in the Chimpanzee. The foramen ovale is between the alisphenoid and the petrosal. The

foramen rotundum is nearly midway between this and the foramen lacerum anterius. The sella turcica is narrow, moderately deep, defended by anterior clinoid processes. The optic foramina are approximated. The entry to the rhinencephalic fossa is much contracted by the bulging prominence of the roofs of the orbits.

4724. The mandible, or lower jaw.

The extent of the oblique anterior division of the first premolar (*p* 3), which answers to the third in the Dog and the second in the Spider-Monkey, gives the appearance of the enamel being continued on the fore part of the anterior fang.

4725. The atlas.

4726. The seventh cervical.

The transverse process, although consisting only of the diapophysis, is grooved on the right and perforated on the left side by the vertebral artery.

4727. The thoracic vertebræ.

They are twelve in number. A rudimental met- and an-apophysis may be recognized in all the dorsal vertebræ after the second: these processes gradually increase in size to the ninth and, more suddenly, in the tenth, where the metapophysis articulates with the accessory facet of the posterior zygapophysis of the ninth dorsal. The met-, an- and di-apophyses have become quite distinct processes in the last dorsal. This is a natural skeleton, and seven pairs of ribs directly articulate with the sternum, which consists of seven bones, the penultimate one being only partially ossified.

4728. The six lumbar vertebræ.

They show the progressive subsidence of the anapophyses to their entire suppression in the last lumbar.

4729. The sacrum.

It includes four anchylosed vertebræ, the fourth having the character of a caudal.

4730. The first free caudal vertebra.

4731. The right scapula.

4732. The right clavicle.

4733. The right humerus.

4734. The right radius.

4735. The right ulna.

4736. The right os innominatum.

4737. The right femur.

4738. The right tibia.

4739. The right fibula.

4740. The left clavicle, longitudinally bisected.

4741. The left humerus, longitudinally bisected.

4742. The left radius, longitudinally bisected.

4743. The left ulna, longitudinally bisected.

4744. The left femur, longitudinally bisected.

4745. The left tibia, longitudinally bisected.

4746. The left fibula, longitudinally bisected.

The following, to No. 4821 inclusive, are parts of the skeleton of a young black Baboon (*Cynocephalus Sphingiola*) :—

Hunterian.

4747. The skull.

The second true molar and the two premolars have lately come into place : the third true molar is still in its formative socket in both jaws. The permanent canine of the left side of the lower jaw has cut the gum : those of the right side and of the upper jaw are still concealed within the bone. All the sutures of the cranium are distinct. The squamosal articulates with the frontal, and prevents the alisphenoid from joining the parietal.

4748. The seven cervical vertebræ.

The vertebral artery perforates the transverse process of the atlas vertically, the neural arch transversely. The pleurapophysis increases in size from the third to the sixth, where it becomes a plate of bone : it is obsolete in the seventh cervical vertebra, the transverse process of which consists of the diapophysis only.

4749. The thirteen dorsal vertebræ.

The metapophysis, at first developed, as usual, above the diapophysis, rises upon the fore part of the prozygapophysis in the eleventh vertebra: the diapophysis is very small in the twelfth vertebra, and an anapophysis is developed from this vertebra: in the thirteenth dorsal both the diapophysis and anapophysis increase in length.

4750. The six lumbar vertebræ.

The diapophysis increases in length and width, and becomes turned upwards at its extremity. The metapophysis is also of considerable length, and has a pointed process developed from its upper and anterior part in the third and fourth lumbars. The anapophysis becomes rudimental in the fifth, and all trace of it is lost in the sixth lumbar vertebra.

4751. The sacrum.

It consists of two vertebræ, whose centrums have not yet coalesced, although their neurapophyses and neural spines have done so.

4752. Fourteen caudal vertebræ.

4753. The thirteen thoracic ribs of the left side.

They all articulate, by means of a head and tubercle, with their respective vertebræ.

4754. The sternum.

It consists of seven bones articulated end to end.

4755. The right scapula.

The spine is perforated by a fissure of an inch and a half in extent.

4756. The left scapula.

The coracoid element has not entirely coalesced with the rest of the bone, either in this or in the preceding scapula.

4757. The left clavicle.

4758. The right clavicle.

4759. The left humerus.

Both proximal and distal epiphyses are unanchylosed. It is not perforated either above or between the condyles.

4760. The left radius.

Its epiphyses are unanchylosed.

4761. The left ulna.

The lesser sigmoid cavity is divided into two facets, by a broad, central, interarticular surface.

4762. The right humerus, longitudinally bisected.

4763. The right radius, longitudinally bisected.

4764. The right ulna, longitudinally bisected.

4765. The right scaphoides.

4766. The left scaphoides.

4767. The right lunare.

4768. The left lunare.

4769. The right cuneiforme.

4770. The left cuneiforme.

4771. The two bones, dismemberments of the scaphoides.

4772. The right trapezium.

4773. The left trapezium.

4774. The right trapezoïdes.

4775. The left trapezoïdes.

4776. The right os magnum.

4777. The left os magnum.

4778. The right os unciforme.

4779. The left os unciforme.

4780. The right first metacarpal.

4781. The left first metacarpal.

4782. The right second metacarpal. 4783. The left second metacarpal.

4784. The right third metacarpal. 4785. The left third metacarpal.

4786. The right fourth metacarpal. 4787. The left fourth metacarpal.

4788. The right fifth metacarpal. 4789. The left fifth metacarpal.

4790. The ossa innominata.

The different bones of which each os innominatum is composed are distinct.

4791. The left femur.

Its epiphyses are unanchylosed.

4792. The left tibia.

Its epiphyses are unanchylosed.

4793. The left fibula.

Its epiphyses are unanchylosed.

4794. The right femur, longitudinally bisected.

4795. The right tibia, longitudinally bisected.

4796. The right fibula, longitudinally bisected. 4797. The patellæ.

4798. The right astragalus. 4799. The left astragalus.

4800. The right calcaneum. 4801. The left calcaneum.

4802. The right os naviculare. 4803. The left os naviculare.

4804. The right entocuneiform. 4805. The left entocuneiform.

4806. The right mesocuneiform.

4807. The left mesocuneiform.

4808. The right ectocuneiform.

4809. The left ectocuneiform.

4810. The right os cuboïdes.

4811. The left os cuboïdes.

4812. The right first metatarsal.

4813. The left first metatarsal.

4814. The right second metatarsal.

4815. The left second metatarsal.

4816. The right third metatarsal.

4817. The left third metatarsal.

4818. The right fourth metatarsal.

4819. The left fourth metatarsal.

4820. The right fifth metatarsal.

4821. The left fifth metatarsal.

4822. The skeleton of a young Dog-faced Baboon (*Cynocephalus Babouin*).

The canines and last molars are still concealed in the jaws. The vertebral formula is:— 7 cervical, 12 dorsal, 7 lumbar, 3 sacral, and 12 caudal; but some of the latter are probably wanting. A rudimental rib is attached to the left diapophysis of the first lumbar vertebra. The animal has died rachitic.

4823. A vertical and longitudinal section of the cranium of a young Yellow Baboon (*Cynocephalus leucophæus*).

The cerebellar fossa of the petrosal is well marked. The vomer extends from the posterior nares to the foramen incisivum. The last permanent molar and canine are still concealed in the substance of the jaw.

4824. The opposite section of the same cranium.

The deciduous canine is retained.

4825. The skull of a young Baboon (*Cynocephalus Anubis*).

The roots of the premolars and the crown of the permanent canine are exposed on the right side.

4826. The skeleton of the Pig-tailed Baboon (*Macacus nemestrinus*).

The vertebral formula is :—7 cervical, 12 dorsal, 7 lumbar, 3 sacral, and 17 caudal. The atlas has a strong hypapophysis, but no neural spine or tubercle : the transverse process is perforated obliquely. The back part of the centrum of the axis is much produced ; that of the third cervical is less produced. The spine of the axis is long and bent backwards. A pleurapophysial plate extends obliquely from the transverse processes of the third, fourth and fifth cervicals, and projects downwards and outwards as a distinct broad plate from that of the sixth vertebra. The long and simple transverse process of the seventh is not perforated by the vertebral artery. Metapophysial tubercles are developed upon the diapophyses of the second and succeeding dorsal vertebræ, increasing in distinctness and size to the tenth : in the eleventh the anapophyses become separate processes, and the metapophyses develope a facet for the accessory articular surface of the posterior zygapophysis of the tenth vertebra. This additional interlocking is continued to the antepenultimate lumbar, the joint being further strengthened by the underlapping of the long anapophyses : these disappear in the last lumbar. The diapophysis is a rudimental ridge in the last dorsal, but becomes a distinct depressed sharp plate in the first lumbar, and progressively increases in size with an antroverted direction in the succeeding lumbar vertebræ. Eight pairs of ribs articulate directly with the sternum, which consists of eight bones and an ensiform cartilage. The short and broad coracoid has an angular tuberosity. The distal end of the humerus is imperforate. The scaphoid is divided, and there is an accessory ossicle between its outer division and the trapezium. The fabellæ are preserved, one behind each condyle of the right femur. There is an accessory ossicle of the tarsus between the cuboid and fifth metatarsal. The right ilium shows repair of injury by disease. The ischia expand into rough flattened tuberosities.

Mus. Brookes.

4827. The skull of the Pig-tailed Baboon (*Macacus nemestrinus*).

Portions of the frontal and parietal bones have been removed by ulceration. The alisphenoid joins the parietal on the right side, and is separated by a very short fronto-squamosal suture on the left. The mature dentition is acquired. The fifth, or supplemental lobe of the last molar is comparatively small in this species.

Presented by Dr. Henderson.

4828. The skull of the *Macacus nemestrinus*, with the entire dentition. *Hunterian.*

The following, to No. 4853 inclusive, are parts of the same skeleton of a *Macacus*, of the size of *M. nemestrinus* :—

Hunterian.

4829. The cranium, with the calvarium detached.

A process of a styliform shape is developed from the lower end of each mastoid. The posterior clinoid plate is largely developed and is perforated. The cerebellar fossa is moderately deep ; the foramen ovale is between the alisphenoid and petrosal. The entry to the rhinencephalic fossa is contracted by a pair of lateral processes.

4830. The lower jaw.

The fifth lobe of the last molar is a small tubercle.

4831. The third and fourth cervical vertebræ.

They show the concavo-convex articular surfaces of the centrum by which the interlocking joints of these vertebræ are effected, and the large size of the zygapophyses. The pleurapophysial tubercle is developed from the transverse process of the fourth vertebra.

4832. The sixth and seventh cervical vertebræ.

They show the long, slender, backwardly-produced pleurapophyses of the sixth vertebra and the simple diapophyses of the seventh, which are grooved below by the vertebral artery.

4833. The first dorsal vertebra.

It shows the articular surfaces for the heads and tubercles of the first pair of ribs, and the accessory, or metapophysial, tubercle upon the diapophysis.

4834. The ninth and tenth dorsal vertebræ.

They show the second accessory, or anapophysial, tubercle upon the diapophysis, and the eversion of the posterior zygagophyses which characterizes the tenth dorsal.

4835. The eleventh and twelfth dorsal vertebræ.

They show the divarication and increase of development of the metapophysis and anapophysis: the diapophysis is still recognizable as a small ridge upon the twelfth dorsal.

4836. The first lumbar vertebra.

It shows a marked increase of the diapophysis, which is developed to an equality of length with the met- and an-apophyses.

4837. The second to the seventh lumbar inclusive.

They show the progressive increase of the diapophyses and decrease of the anapophyses.

4838. The sacrum.

It consists of three anchylosed vertebræ. The first two support the articulations with the iliac bones.

4839. The six anterior caudal vertebræ.

In these the neural arch is complete.

4840. The nine succeeding caudal vertebræ.

They are more elongated, and the neural arch has ceased to be developed.

4841. The first pair of thoracic ribs.

They show the proportionally long cervix and the large tubercle.

4842. The clavicles.

4843. The left scapula.

The angular tubercle of the coracoid is nearly half the length of the process itself.

4844. The left humerus.

It is perforated between the condyles.

4845. The left ulna.

4846. The left radius.

4847. The left os innominatum.

4848. The left femur.

4849. The left tibia.

4850. The left fibula.

4851. The calcaneum and astragalus.

4852. The manubrium, or first bone of the sternum.

4853. The right patella.

4854. The skull of a Macacus, about the size of *M. nemestrinus*.

It resembles that of No. 4827 in the small size of the fifth lobe of the last lower molar, but differs by its shorter nasal bones.

Hunterian.

The following, to No. 4917 inclusive, are parts of the same skeleton of the Black Monkey (*Macacus niger*) :—

Presented by the Zoological Society of London.

4855. The skull.

The last true molars (m 3) are still concealed. The premaxillaries join the nasals.

4856. The atlas.

The neural arch and transverse process are both perforated by the vertebral artery. The neural arch is likewise perforated at right angles to the arterial foramen and groove.

4857. The axis.

4858. The third, fourth, fifth and sixth cervical vertebræ.

The pleurapophysis increases from the first of these until it becomes a flat plate in the sixth cervical with its outer extremities produced in opposite directions.

4859. The seventh cervical vertebra.

The transverse process consists of the diapophysis only.

4860. The thirteen dorsal vertebræ.

4861. The seven lumbar vertebræ.

The diapophysis increases in size from the first to the fifth, but diminishes in the two following. The metapophyses and anapophyses gradually diminish in size and distinctness to the sixth, and the anapophysis disappears in the last lumbar.

4862. The sacrum.

It consists of two anchylosed vertebræ. The metapophyses are still persistent, although small.

4863. The three bones of which the coccyx or tail consists.

4864. The thirteen pairs of thoracic ribs.

4865. The sternum.

It consists of a manubrium and five other bones.

4866. The clavicles.

4867. The scapulæ.

4868. The right humerus.

The upper epiphysis is still unattached: it is not perforated above or between the condyles.

4869. The right radius.

It wants the lower epiphysis.

4870. The right ulna.

It likewise wants the lower epiphysis. The lesser sigmoid cavity is divided into two facets by a non-articular portion. The olecranon, although attached to the shaft, shows indications of its original separation.

4871. The right scaphoïdes.

4872. The right lunare.

4873. The right cuneiforme.

4874. The right trapezium.

4875. The right trapezoïdes.

4876. The right os magnum.

4877. The right unciforme.

4878. The pisiform, and the dismemberments of the scaphoid bones.

4879. The right first metacarpal.

4880. The right second metacarpal.

4881. The right third metacarpal.

4882. The right fourth metacarpal.

4883. The right fifth metacarpal.

4884. The left os scaphoïdes.

4885. The left os lunare.

4886. The left os cuneiforme.

4887. The left os trapezium.

4888. The left os trapezoïdes.

4889. The left os magnum.

4890. The left os unciforme.

4891. The left first metacarpal.

4892. The left second metacarpal.

4893. The left third metacarpal.

4894. The left fourth metacarpal.

4895. The left fifth metacarpal.

4896. The ossa innominata.

4897. The right femur.

The prior separation of both great and small trochanters is still obvious: the condyloid epiphysis remains unattached to the shaft.

4898. The right tibia.

Neither the upper nor lower epiphyses have become anchylosed to the shaft.

4899. The right fibula.

The upper epiphysis is wanting.

4900. The right astragalus.

4901. The right calcaneum.

4902. The right cuboides.

4903. The right naviculare.

4904. The right entocuneiforme.

4905. The right mesocuneiforme.

4906. The right ectocuneiforme.

4907. The right first metatarsal.

4908. The right second metatarsal.

4909. The right third metatarsal.

4910. The right fourth metatarsal.

4911. The right fifth metatarsal.

4912. The left humerus, longitudinally bisected.

4913. The left radius, longitudinally bisected.

4914. The left ulna, longitudinally bisected.

4915. The left femur, longitudinally bisected.

4916. The left tibia, longitudinally bisected.

4917. The left fibula, longitudinally bisected.

4918. The skull of a male Grey Baboon (*Macacus Hamadryas*).

The dentition is entire. The left side of the lower jaw has been diseased.

Hunterian.

4919. The skeleton of a Macacus, about the size of *M. nemestrinus.*

The vertebral formula is :—7 cervical, 12 dorsal, 7 lumbar, 3 sacral; 3 caudal are preserved. The mature dentition is acquired. The back part of the sagittal and the contiguous parts of the lambdoidal sutures are dentated. A styliform process is produced from the lower part of the mastoid.

It differs from Nos. 4827 & 4854 in the larger proportional size of the fifth lobe of the last lower molar tooth.

Purchased.

The following, to No. 4989 inclusive, are parts of the same skeleton of a Macacus, about the size of *M. Inuus*, but with a tail :—

Hunterian.

4920. The cranium.

It is transversely bisected across the petrosals, and through a united fracture near the coronal suture. The permanent canines have the crown worn, and the fang decreases to a point, but the last true molar has not cut the gum in either jaw. The third division of the fifth pair of nerves has notched the alisphenoid, and part of it has pierced the base of the ectopterygoid. The eustachian process of the petrosal is short. This skull betrays an unusual defect of symmetry: the facial part, especially of the right posterior nostril, is smaller than the left.

4921. The lower jaw.

The fifth lobe of the last molar is as much developed as in the *Macacus Inuus.*

4922. The atlas.

It has a hypapophysial tubercle. The transverse process is perforated lengthwise by the vertebral artery, which afterwards perforates the neural arch.

4923. The axis.

4924. The five succeeding cervical vertebræ.

The transverse processes of the seventh are grooved, but not perforated, by the vertebral artery. The simple spines progressively increase in length.

4925. Twelve dorsal vertebræ.

In these may be remarked the gradual change of position in the metapophysis, and the corresponding change of direction of the zygapophyses, in the last three vertebræ. The diapophysis is retained, together with the anapophysis in each vertebra.

4926. The six lumbar vertebræ.

4927. The sacrum.

It consists of three vertebræ. The articular surface for the iliac bones is formed of the first two.

4928. Four proximal caudal vertebræ.

4929. Ten distal caudal vertebræ.

4930. The first pair of ribs.

The great length of the cervix and large size of the tubercle are worthy of notice.

4931. The second pair of ribs.

4932. The third pair of ribs.

4933. The fourth pair of ribs.

4934. The fifth pair of ribs.

4935. The sixth pair of ribs.

4936. The seventh pair of ribs.

4937. The eighth pair of ribs.

4938. The ninth pair of ribs.

4939. The tenth pair of ribs.

The junction of the cervix with the shaft is now becoming less angular.

4940. The eleventh pair of ribs.

4941. The twelfth pair of ribs.

4942. The thirteenth pair of ribs.

Each rib is remarkably curved.

4943. The manubrium and five other bones of the sternum.

4944. The clavicles.

4945. The right scapula.

4946. The right humerus.

4947. The right radius.

4948. The right ulna.

4949. The right scaphoïdes.

4950. The right lunare.

4951. The right cuneiforme.

4952. The right trapezium.

4953. The right trapezoïdes.

4954. The right magnum.

4955. The right unciforme.

4956. The left scaphoïdes.

4957. The left lunare.

4958. The left cuneiforme.

4959. The left unciforme.

4960. The left os magnum.

4961. The left trapezoïdes.

4962. The left trapezium.

4963. The ossa pisiformia.

4964. Two bones, dismemberments of the scaphoïdes.

4965. The right os innominatum.

4966. The right femur.

4967. The right tibia.

4968. The right fibula.

4969. The patellæ.

4970. The right astragalus.

4971. The right calcaneum.

4972. The right naviculare.

4973. The right cuboïdes.

4974. The right entocuneiforme.

4975. The right mesocuneiforme.

4976. The right ectocuneiforme.

4977. The left astragalus.

4978. The left calcaneum.

4979. The left cuboïdes.

4980. The left naviculare.

4981. The left entocuneiforme.

4982. The left mesocuneiforme.

4983. The left ectocuneiforme.

4984. The left humerus, longitudinally bisected.

4985. The left radius, longitudinally bisected.

4986. The left ulna, longitudinally bisected.

4987. The left femur, longitudinally bisected.

4988. The left tibia, longitudinally bisected.

4989. The left fibula, longitudinally bisected.

4990. The skeleton of a Short-tailed Monkey (*Macacus Rhesus*).

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, 3 sacral, and 15 caudal. The atlas has a strong hypapophysis. The pleurapophysial part begins to be developed in the transverse process of the third cervical, and suddenly increases in the sixth, where it forms a short but very broad plate, produced forwards and backwards: it is wanting in the transverse process of the seventh, in which vertebra the right diapophysis is perforated, but not the left. The accessory tubercle progressively increases and elongates as the dorsal vertebræ recede from the neck, and the metapophysis and anapophysis become distinct upon the ninth dorsal, and separate from each other upon the succeeding dorsal vertebræ: the anapophysis disappears in the last lumbar. The humerus is imperforate at its distal end. The scaphoid is divided in the wrist. The specimen has not acquired its last molar teeth.

Purchased.

4991. The skeleton of a male Short-tailed Monkey (*Macacus Rhesus*).

The permanent teeth have been fully acquired. The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, 3 sacral, and 15 caudal.

Purchased.

4992. The skeleton of a young *Macacus Rhesus.*

The deciduous molars are not completely shed in the lower jaw, and the last true molars and permanent canines have not been acquired. The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, and 3 sacral: there are 12 caudal vertebræ, but the series is incomplete.

Mus. South.

4993. The skull of a female *Macacus Rhesus.*

The last true molars are not fully developed.

Hunterian.

4994. The skull, vertically and longitudinally bisected, of a *Macacus Rhesus.*

Hunterian.

4995. The skull of a *Macacus Rhesus.*

The teeth have been removed from the right side of both upper and lower jaws and are separately displayed. The squamosals have coalesced with the parietals.

Hunterian.

4996. The skeleton of a *Macacus radiatus.*

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, 3 sacral, and 22 caudal. The simple transverse processes of the seventh cervical are imperforate. The tripartite character of the dorsal transverse process is well shown on the tenth of that series. The fabellæ are retained behind the condyles of each femur. Hæmapophyses are present beneath the four anterior interspaces of the caudal vertebræ: hypapophyses only are developed in the succeeding ones.

Mus. South.

4997. The skull of a young *Macacus radiatus.*

The permanent canines and last molars have not cut the gum.

Hunterian.

4998. The skull of an immature *Macacus pileatus.*

The canines have pierced the gum, but the last molars are still concealed in their formative alveoli.

Hunterian.

4999. The skull of a male *Macacus cynomolgus.*

The facial bones are partially diseased. The permanent dentition has been fully acquired and somewhat worn.

Hunterian.

5000. The skull of a *Macacus cynomolgus,* with the mature dentition.

The teeth are removed from the left side of the upper and lower jaws and separately displayed.

Presented by Henry Cline, Esq.

5001. The skull of a *Macacus sinicus,* with the mature dentition. *Mus. Brookes.*

5002. The lower jaw of a *Macacus sinicus.*

The teeth have been removed from the right side and are separately displayed.

Hunterian.

5003. The skull of an immature *Macacus Silenus.*

The permanent canines and last molars are undeveloped. The calvarium has been removed.

Hunterian.

Genus *Semnopithecus.*

5004. The skeleton of the Entellus Monkey (*Semnopithecus Entellus*).

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, 2 sacral, and 25 caudal: a few of this series, and the atlas, are wanting. The cervical transverse processes incline downwards: their pleurapophysial divisions from the second to the sixth increase; but this part is wanting in the seventh, and the transverse process is imperforate. The accessory tubercle is well developed on the diapophysis of the ninth and tenth dorsals; the diapophysial part disappears on the eleventh and twelfth dorsals, in which the accessory tubercle becomes divided into two well-marked processes, viz. the met- and an-apophyses. The diapophysis reappears on the first lumbar, and progressively increases to the antepenultimate one. The metapophysis exists as an elongated tubercle outside the prozygapophysis from the eleventh dorsal to the last lumbar, and the anapophysis is present from the tenth dorsal to the sixth lumbar. The hæmal arch is present in a few of the anterior caudal vertebræ. Seven pairs of ribs directly articulate with the sternum, which consists of six bones. The humerus is imperforate at its distal end. The specimen is from an immature animal still retaining the deciduous molars and canines.

Mus. South.

5005. The skull of an adult male *Semnopithecus Entellus.*

Most of the cranial sutures are obliterated, and a strong superoccipital ridge is developed. The temporal ridges do not meet to form a parietal crest. The premaxillaries ascend above the lower half of the nasals.

Purchased.

5006. The cranium, with the calvarium detached, of an adult male *Semnopithecus Entellus.*

The cerebellar fossa of the petrosal is both large and deep. The entry to the rhinencephalic fossa is constricted by the approximation of its lateral margins, which almost touch at the middle. The foramen ovale is between the petrosal and the alisphenoid. There are both anterior and posterior clinoid plates, and processes likewise extend from the posterior clinoid plate to join the petrosal. The lateral and posterior cranial parietes are very thin and without diploë. The intervening angle is very thick and supplied with air-cells, which extend into the mastoid and squamosal.

Purchased.

5007. The cranium of an adult female *Semnopithecus,* showing the sexual inferiority of size in the canines.

This animal has suffered a severe fracture of the parietes of the left orbit. The alisphenoid joins the parietal.

Purchased.

5008. The skull of a *Semnopithecus,* with the deciduous teeth. *Purchased.*

Genus *Cercopithecus.*

5009. The skeleton of a young Monkey, ascribed in the MS. Catalogue to the *Cercopithecus ruber.*

The vertebral formula is:—7 cervical, 12 dorsal, 7 lumbar, 1 sacral, and 28 caudal. In older individuals one or two of the anterior of the caudal vertebræ would doubtless coalesce with the single vertebra which now articulates with the ilium. The metapophysis and anapophysis are separate and distinct in the eleventh dorsal to the antepenultimate lumbar, after which the anapophysis disappears. The transverse process of the atlas is perforated lengthwise and vertically; that of the seventh cervical is imperforate. The alisphenoid joins the parietal on the left side. The premaxillaries ascend high between the maxillaries and the nasals.

This animal still retains the deciduous teeth, and would apparently have attained a larger size than that of the adult *Cercopithecus ruber.*

Mus. South.

5010. The cranium of a male *Cercopithecus sabæus,* with a slight unsymmetrical distortion of the bones of the face. *Presented by Henry Cline, Esq.*

5011. The skull of the White-throated Monkey (*Cercopithecus albogularis*).

The deciduous teeth and the germ of the first permanent molar remain on the left side of the upper jaw.

Hunterian.

5012. The skull of the *Cercopithecus albogularis.*

It is from an animal of a similar immature age. In both these skulls the premaxillary bones articulate with a considerable proportion of the nasals, and the alisphenoid joins the parietal; in which characters they resemble the skull of the *Semnopithecus Entellus.*

Mus. Brit.

5013. The cranium of a young Monkey (*Cercopithecus cephus*).

The deciduous molars and canines are retained, but with the anterior permanent incisors and first and second true molars in place. The calvarium is detached, showing a tumefaction of the right parietal. In the interior of the cranium may be noticed the deep cerebellar fossa of the petrosal, the deep sella with anterior and posterior clinoid processes, the latter uniting above to form a bony arch, and the well-developed crista galli and the deep canal of the rhinencephalic fossa.

Hunterian.

5014. The skull, with the calvarium removed, of the Purple-faced Monkey (*Cercopithecus cephalopterus*). *Presented by Henry Cline, Esq.*

5015. The cranium of apparently the same species of *Cercopithecus.* *Mus. Brit.*

5016. The skull of a male Green Monkey (*Cercopithecus sabæus*).

The dentition is nearly complete: the last molar of the left side has not cut the gum in either jaw.

Hunterian.

5017. The skull of an immature Green Monkey (*Cercopithecus sabæus*). *Purchased.*

5018. The skeleton of a male Monkey (*Cercopithecus*).

The vertebral formula is:—7 cervical, 11 dorsal, 7 lumbar, 2 sacral, and 21 caudal. There is a fabella behind each condyle of the femur. All the permanent teeth, except the last molar (*m* 3), have come into place.

The species affording this skeleton is stated in the 'Osteological Catalogue' of 1832 to have resembled the Malbrouk; but it is less than the *Cercopithecus cynosurus.*

Presented by William Home Clift, Esq.

5019. The cranium, longitudinally and vertically bisected, of the *Cercopithecus cephalopterus.* *Hunterian.*

5020. The skull, with the deciduous molars and canines retained, of the White-nosed Monkey (*Cercopithecus nictitans*). *Mus. South.*

5021. The skull of a young Diana-Monkey (*Cercopithecus Diana*).

The first true molars are in place, and the upper anterior canines are coming through the bones: the rest of the dentition belongs to the deciduous series.

Purchased.

5022. The cranium, with the deciduous dentition, of a young White-throated Monkey (*Cercopithecus albogularis*).

The first true molars have not cut the gum. The elements of the occipital have coalesced, and likewise those which form the complex 'temporal bone' of Anthropotomy. The mastoid process is styliform. The upper deciduous canines are implanted by two connate fangs.

Hunterian.

5023. The skull of a young Patas Monkey (*Cercopithecus ruber*).

The deciduous teeth are retained and the first true molars of the permanent series have been acquired: the germs of other teeth of the permanent series are exposed on the right side of both jaws. The calvarium is detached.

Purchased.

5024. The skull of a young female Patas Monkey (*Cercopithecus ruber*).

The postglenoid processes are pointed or styliform.

Purchased.

5025. The cranium of a young *Cercopithecus*.

The entocarotids have been injected to demonstrate the carotid foramina which pierce the petrosals.

Purchased.

(With a broad sternum.)

Genus *Hylobates*.

5026. The skeleton of a Silvery Gibbon (*Hylobates leuciscus*).

The vertebral formula is:—7 cervical, 13 dorsal, 5 lumbar, 5 sacral, and 2 caudal. The transverse process of the atlas is perforated lengthwise, the neural arch is grooved, by the vertebral artery. A pleurapophysial part of the transverse process begins to project forwards on the fifth cervical, and becomes a distinct and larger depressed plate on the sixth: the transverse process of the seventh is a simple diapophysis, and is imperforate. The metapophysis and anapophysis become distinct in the twelfth dorsal, and diverge from each other with increase of size in the thirteenth. The anapophysis disappears in the lumbar vertebræ, whilst the diapophysis reappears and the metapophysis is retained.

The spinous processes slightly, but progressively, increase in length and antero-posterior

breadth from the anterior dorsal to the penultimate lumbar. Eight pairs of ribs directly join the sternum, which consists of four broad and flattened bones: three pairs of ribs, besides the clavicles, articulate with the large manubrium. Both acromion and coracoid are large, and much produced. The clavicles are of unusual length, equalling the extent of the eleven anterior dorsal vertebræ. The bones of the arm and fore-arm are still more remarkable for their length and slenderness, as well as those of the fingers of the hand, the thumb of which is comparatively short and slender. The femur is long and nearly straight. The tibia is slightly bent. The thumb of the hind foot is strong and well-developed, with two phalanges.

The great length of the pectoral limbs, and the provision made for the extensive origin of some of their muscles, by the breadth of the thorax and the size of the scapulæ and clavicles, relate to the chief share which these limbs take in the rapid and characteristic locomotion of this species, which swings itself thereby from branch to branch, with a force that propels the body through considerable distances.

Presented by Dr. Henderson.

5027. The skeleton of the Gibbon which has been especially called the 'Long-armed Ape' (*Hylobates Lar*).

The vertebral formula is:—7 cervical, 13 dorsal, 5 lumbar, 5 sacral, and 2 caudal. The characters of these vertebræ resemble those in the preceding species, except that a rudiment of the anapophysis may be observed in the first and second lumbars. Seven pairs of ribs directly join the sternum, which is here reduced, by anchylosis, to two bones,—the manubrium and the so-called body. Only the first pair of ribs and half of the second pair join the manubrium. The characters of the bones of the extremities repeat those of the preceding specimen, in neither of which is the humerus perforated at its distal end.

Mus. Brookes.

5028. The bones of the trunk and extremities of an immature male specimen of the Greater Gibbon (*Hylobates variegatus*).

The vertebral formula is:—7 cervical, 13 dorsal, 5 lumbar, and 7 sacro-caudal. Seven pairs of ribs directly join the sternum, which consists of the manubrium, the body, and a slender bony base of the 'ensiform cartilage.' Two pairs of ribs, and part of a third pair, articulate with the manubrium. The diapophysis, metapophysis and anapophysis are distinct in the first lumbar.

From the forests of Deval, Bengal.

Presented by Dr. Henderson.

5029. The bones of the trunk and the scapular arch of a Gibbon (*Hylobates*).

The number of 'true vertebræ' is the same as in the preceding skeletons of the Gibbons, but in this specimen there are fourteen pairs of ribs, a short and straight pair being developed from the vertebra answering to the first lumbar in the preceding specimens. The anapophysis, which begins to be developed and projects backwards from the last dorsal, increases in length and distinctness in the two succeeding vertebræ, diminishes suddenly in the third, and disap-

pears in the last free lumbar vertebra. Five vertebræ here compose the sacrum, and four others may be traced in the rudiment of the tail. Eight pairs of ribs directly join the sternum, in which four bones may be distinguished, besides the broad manubrium: to this are articulated the first, second, and half of the third pairs of ribs. The lumbar series forms a straight line with the contiguous half of the dorsal series.

Hunterian.

5030. The cranium, vertically and longitudinally bisected, of a young Gibbon (*Hylobates*).

The deciduous molars have not been shed: the first true molar is come into place, and the second has pushed its crown through the alveolar outlet. The canine and the two premolars are exposed, in their formative alveoli, in the left half section. The chief peculiarity of this skull is the backward extension of the frontal to the superoccipital, with which it unites, separating the parietals from each other, as in many fishes, *e. g.* No. 148. The interparietal portion of the frontal has been a quarter of an inch in breadth. The alisphenoid is perforated by the foramen ovale, and unites with the parietal. The premaxillary does not reach so high as to join the nasal. In the interior of the cranium may be noticed the deep cerebellar fossa in the petrosal, and the extension of the posterior clinoid process forwards to join the anterior one. The lateral sinus terminates in the fossa jugularis.

Hunterian.

5031. The skeleton of a Siamang, or Ungka Ape (*Hylobates syndactyla*).

This is of an immature animal with the deciduous teeth. The vertebral formula is:—7 cervical, 13 dorsal, 4 lumbar, and 8 sacro-caudal. The pelvic extremities are not so long in proportion in this species as in the true Gibbons, and the pectoral extremities are still more remarkable for their length and slenderness. Seven pairs of ribs join the sternum directly, the elements of which have already coalesced into a manubrium and body. The first, second, and half the third pairs of ribs articulate with the manubrium. The superoccipital has coalesced with the left parietal, although the suture between it and the exoccipitals is not yet obliterated. The alisphenoids join the parietals: the premaxillaries do not reach the nasals.

Mus. Brookes.

The following, to No. 5049 inclusive, are parts of the same skeleton of an adult male Siamang (*Hylobates syndactyla*):—

Presented by George Bennett, Esq., F.L.S.

5032. The cranium.

Almost all the sutures of the skull are obliterated; the border of the orbit is thick and prominent, but the superciliary portions do not meet above the nose. The petrosal is no longer swollen into a cellular bulla, but exhibits a well-marked eustachian process. The ento- and post-glenoid processes are well developed. The foramen ovale pierces the alisphenoid. The inner half of the grinding surface of the upper molars, and the outer half of the lower ones, are worn down and deeply stained.

5033. The last dorsal, four lumbar and five sacral vertebræ.

The last dorsal shows well the separate diapophyses, metapophyses, anapophyses, and zygapophyses, more particularly the distinction between the anterior zygapophysis and the now superadded metapophysis. The diapophyses are broad, depressed plates, progressively increasing in the first three lumbar, whilst the anapophyses diminish and disappear on the third lumbar. The metapophysis recedes from the anterior zygapophysis in the last lumbar, and becomes quite distinct from it in the first sacral, in which, nevertheless, the articular surface of the zygapophysis has a nearly vertical position.

The sacrum, by its greater breadth and the number of vertebræ forming it, indicates the nearer affinity of the Siamang to the Orang.

5034. The left clavicle.

It is subcompressed, curved, and equals the scapula in length.

5035. The left scapula.

The supraspinal nearly equals the infraspinal fossa in depth: both acromion and coracoid are remarkable for their length.

5036. The right humerus.

This bone is eleven inches in length, is straight, with a very deep bicipital groove, and is imperforate at its distal end.

5037. The right radius.

From the surface which articulates with the humerus, to the apex of its styloid process, this bone measures twelve inches.

5038. The right ulna.

From the summit of the olecranon to the apex of its styloid process, this bone measures twelve inches and a half.

5039. The bones of the left hand, naturally articulated, with the nails.

The carpus shows a dismemberment of the scaphoid, wedged between the main part of that bone and the trapezoïdes: therc is also an accessory ossicle between the scaphoid and trapezium. The pollex extends a little way beyond the proximal end of thc first phalanx of the index; and the first and second phalanges of the fingers are curved, and slightly expanded at their middle part.

5040. The ossa innominata.

5041. The right femur.

From the highest point of the head to the lowest part of the internal condyle, this bone measures eight inches and three-quarters. The shaft is rounded, slender and straight.

5042. The right tibia.

From the upper articular surface to the end of the malleolar process it measures seven inches and a half.

5043. The right fibula.

This bone measures seven inches.

5044. The bones of the right foot, naturally articulated, with the nails.

The calcaneum projects a very short way beyond the astragalus, the tibial surface of which is bent obliquely inwards, so that the foot presents its outer edge to the ground: this mode of articulation with the leg favours its prehensile power. The hallux reaches nearly to the distal end of the first phalanx of the next toe: the four outer toes are shorter and more slender than the corresponding digits of the hand.

5045. The left humerus, longitudinally bisected.

5046. The left radius, longitudinally bisected.

5047. The left ulna, longitudinally bisected.

5048. The left femur, longitudinally bisected.

5049. The left tibia, longitudinally bisected.

Genus *Pithecus*.

5050. The skeleton of an adult male Sumatran Orang-utan (*Pithecus Satyrus*, var. *Abelii**).

The vertebral formula is:—7 cervical, 12 dorsal, 5 lumbar, 5 sacral: there are 2 caudal,

* It resembles the Bornean variety called 'Mias Rambi' by Rajah Brooke.

but a third is wanting. The transverse process of the atlas is bituberculate, and is perforated lengthwise by the vertebral artery, which afterwards grooves the neural arch: there is a low hypapophysial tubercle, but no neural spine. The transverse process of the axis is deeply grooved, but not perforated; consisting almost entirely of the pleurapophysial portion. In the third vertebra the two portions of the transverse process are united, external to the perforation by the vertebral artery. In the fourth cervical the pleurapophysial part projects distinctly below the diapophysial part, and progressively diverges in the fifth and sixth, increasing in size, especially in the latter, without, however, acquiring that antero-posterior breadth which gives it the lamelliform character in the inferior apes. In the present skeleton the intermediate plate of bone uniting these divisions of the transverse process is not perforated on the right side. The transverse process of the seventh cervical consists of the diapophysis only, and is grooved below, not perforated, by the vertebral artery. The distinct nature of the equally simple transverse process in the second and seventh cervical vertebræ of this Orang is well shown by their different relative positions to the groove with which the vertebral artery has impressed them. The neural spine of the axis is bifurcated; that of the third cervical is simple, but is long and slender; those of the succeeding cervicals are still longer, and progressively increase in thickness as well as length. The metapophysis appears as a tubercle, near the base of the anterior zygapophysis of the twelfth dorsal: it is equally distinct on the first lumbar, but subsides to a slight eminence on the succeeding lumbar vertebræ. The anapophysis is only distinguishable from the diapophysis upon the first lumbar vertebra, where it serves to illustrate the true relation of the diapophysis of that vertebra to those of the antecedent dorsals and the succeeding lumbars. The spine of the third dorsal has an anterior and posterior prominence: the succeeding spines gradually diminish in length, but increase in breadth and antero-posterior extent to the penultimate lumbar. Seven pairs of ribs directly articulate with the sternum, which has consisted of the manubrium and four pairs of ossicles, the two lower pairs of which have coalesced. The manubrium is broad, but shorter than in the Gibbons, and receives only the first and part of the second pairs of ribs. The right clavicle has been broken, and has united, much shortened and thickened. The scapula approaches, by its breadth, to the form of that of Man, but the acromion is narrower, longer, and more antroverted. The humerus shows a small perforation between the condyles, but none above the inner condyle. The radius and ulna are remarkable for their length, and the extent of the interosseous space. The wrist consists of nine bones, as in the inferior apes,—resulting, as in them, from the dismemberment of the scaphoid. The bones of the thigh and leg are disproportionately short: the articulation of the latter with the tarsus is so adjusted as to turn the sole obliquely inwards. The hallux is disproportionately short, and appears to have had but one phalanx. The bones of the other toes are as remarkable for their length, especially the metatarsals and proximal phalanges, which are likewise bent towards the sole, indicating the habitual application of the foot in the act of grasping, in accordance with the arboreal habits and sphere of existence of this great anthropoid ape.

Presented by Sir Stamford Raffles, P.Z.S.

5051. The skull of a large male Bornean Orang-utan, the Pongo of Baron Wurmb (*Pithecus Satyrus*, var. *Wurmbii*)*.

It shows the full dentition of maturity. The last molar is wanting in the upper jaw and in the left side of the lower jaw of the Sumatran skeleton, but it is retained in both jaws in the present skull. A slight trace of the maxillo-premaxillary suture is still discernible in the fore part of the upper jaw.

Presented by Sir William Blizard, F.R.S.

5052. The radius and ulna of the same Orang-utan (*Pithecus Satyrus*, var. *Wurmbii*).

The sigmoid cavity of the ulna is less equally divided than in Man, the outer division being broader and its lower border more prominent: there is a deep elongated rough fossa beneath this division on the fore part of the shaft, which does not exist in Man. The short but well-marked ridge below the lesser sigmoid cavity of the Human ulna is very feebly represented in the Orang. The canal of the medullary artery enters the fore part of the shaft and inclines proximad in both bones of the fore-arm, but enters lower down the middle of the shaft of the radius in the Orang than in Man. The ulna is bent in the opposite direction to the radius, whilst in Man the shaft is straight, and that of the radius is less bent: in both bones the interosseous margin is sharper and more produced in Man.

There is a rough prominent ridge on the radial side of the distal expanded extremity of the shaft of the radius in the Orang; the fore part of that expanded end is excavated and the styloid angle less produced than in Man. The styloid process of the ulna is more produced than in Man, but the articular surface does not extend to it, being limited to the convex border joining the radius, where it presents a reniform figure, longest in the direction from before backwards.

Presented by Sir William Blizard, F.R.S.

5053. The right ulna of the same Orang-utan (*Pithecus Satyrus*, var. *Wurmbii*).

Presented by Sir William Blizard, F.R.S.

5054. The cranium, vertically and longitudinally bisected, of an adult male Bornean Orang-utan (*Pithecus Satyrus*, of the variety called '*Mias Rambi*').

The area of the nasal cavity equals more than one-third of that of the cranial cavity. The most anterior part of this cavity is formed by the deep, narrow, and well-defined rhinencephalic fossa: the 'crista galli' is rudimental. The division of the prosencephalic compartment, for the anterior and middle lobes of the cerebrum, is very slightly defined by the orbitosphenoid. The tentorial ridge is not continued backwards beyond the petrosal, and this is not impressed by a cerebellar pit. The basisphenoid has coalesced with the basioccipital. The sphenoidal sinus is almost wholly formed by the presphenoid, and it is divided by a longitudinal septum. The lower border of the basi-occipito-sphenoidal floor of the cra-

* This appears to be the same with the Bornean Orang, called 'Mias Pappan' by Rajah Brooke.

nium is parallel with the bony palate or floor of the nostrils. The plane of the occipital foramen forms an open angle with the straight basi-occipito-sphenoidal line. The interorbital sinuses do not ascend to within half an inch of the upper level of the orbits, and there is consequently no proper frontal sinus: a cancellous structure occupies the usual place of this, below which, the part of the interorbital septum formed by the hinder crista of the nasal bone and the frontal presents a very compact dense structure. The small venous canal continued from the foramen cæcum traverses the base of this septum to terminate at the lower end of the short nasal bone. The lamina perpendicularis æthmoidei presents a quadrate form eight lines in diameter. The floor of the nasal cavity is long and thick, as compared with that in Man, and a larger proportion of it is contributed by the premaxillary. The part of the premaxillary divided by the section is absolutely longer, larger, and more nearly parallel with the palato-nasal plate of the maxillary than in the Gorilla (No. 5178). The nasal end of the incisive canal is divided by the process extending from the premaxillary to the maxillary; but this is the only part of the premaxillary which has not coalesced with the maxillary; every other trace of the original suture has disappeared, even that on the palate. There is no production of the nasal below the crista sent backwards to form the dense interorbital septum, and no production of the feebly-marked superorbital boundary, forwards and upwards, to form a crest, as in the Gorilla. The turbinal plates are less developed than in the Gorilla; the lower one is shorter than the one above; and there is not any plate answering to the small superior turbinal in the Gorilla and in Man. Both lambdoidal and sagittal cristæ are much less developed than in the Wurmbian variety of Orang. There is a rudimental styloid process, formed by the anchylosed base of the stylohyal, which is defended in front by a low and obtuse vaginal process.

Presented by Sir James Brooke, Rajah of Sarawak.

5055. The lower jaw, vertically bisected at the symphysis, of the same Orang-utan (*Pithecus Satyrus*).

The compact wall of the symphysis is thick and dense. The symphysis slopes from above downwards and backwards. The outer alveolar process of the second premolar (p 4) has been partially absorbed in both rami.

Presented by Sir James Brooke, Rajah of Sarawak.

5056. The skull of an adult female Orang-utan (*Pithecus Satyrus*, of the variety called '*Mias Rambi*').

The roots of the teeth are exposed on the right side of both jaws, showing that the premolars as well as the true molars are implanted by three distinct fangs, two external and one internal. The back part of the cranium has been mutilated by the removal of a great part of the superoccipital. In the interior of the cranium it may be observed that the petrosal has no cerebellar pit: the posterior clinoid processes have not only coalesced with each other, forming a bony arch above the basisphenoid, but have also coalesced with the anterior clinoid processes, forming arches above the sides of the sella turcica. The inward projection of the orbits gives great depth to the intermediate contracted rhinencephalic fossa, in the bottom of

which may be discerned a small 'crista galli' dividing the cribriform plate: a falculate ridge, not continued from this, projects inwardly from the fore part of the frontal. The bases of the stylohyals have been ossified and anchylosed to the stylohyal fossa. The precondyloid foramen is double on the left side.

Presented by Prof. Owen, F.R.S.

5057. The skeleton of a young female Orang-utan (*Pithecus Satyrus*).

It has acquired the first permanent molar in both jaws, but retains all the deciduous dentition. The vertebral formula is:—7 cervical, 12 dorsal, 4 lumbar, and 8 sacro-caudal of which the first three articulate with the iliac bones: the constituents of the ossa innominata are still ununited, and the epiphyses of the long bones have not coalesced with the shafts.

The animal from which this skeleton was prepared was brought to England by Dr. Abel, who accompanied Lord Amherst, in the Embassy to China, in the year 1817. It was a native of Borneo. It arrived in England in August 1817, and survived its transportation to this country until the 1st of April 1819, during which period it was kept in the Menagerie at Exeter Change.

Presented by Sir Everard Home, Bart., V.P.R.S.

5058. The skeleton of a younger Orang-utan (*Pithecus Satyrus*).

It shows the deciduous dentition: the first permanent molar is beginning to protrude from its formative alveolus. The vertebral formula is:—7 cervical, 12 dorsal, 4 lumbar, and 8 sacro-caudal, the first three of which articulate with the iliac bones. The pleurapophyses, or portions by which the sacral vertebræ effect their articulation with the ossa innominata, still show traces of their primitive distinctness from the centrum. In both this and the preceding skeleton, the body of the sternum shows the same composition of four pairs of ossicles unsymmetrically arranged, and in both, the hallux has but one phalanx, which appears to be more common in the female than in the male sex.

Mus. Brookes.

5059. The skull of a young Orang-utan (*Pithecus Satyrus*).

The deciduous teeth are retained and the first true molars are in place. The maxillo-premaxillary sutures are not obliterated. The precondyloid foramina are double on each side. The alisphenoids join the parietals.

Presented by Sir Stamford Raffles, P.Z.S.

The following, to No. 5079 inclusive, are parts of the same skeleton of the Orang-utan (*Pithecus Satyrus*):—

Purchased.

5060. The skull.

It shows an intermediate change in the state of the dentition between Nos. 5056 & 5060.

In the upper jaw the lateral incisors, canines and molars of the deciduous series are retained, and the large median incisors and first and second true molars are in place. In the

lower jaw, the left lateral incisor, the canines and molars of the deciduous series are retained, while the four permanent incisors and the first and second molars are in place. The germs of the permanent canines and premolars are exposed in their formative alveoli on the left side of both upper and lower jaw.

5061. The atlas.

The transverse process is perforated lengthwise by the vertebral artery, which afterwards slightly grooves the neural arch. The sutures between this arch and the bony bar (hypapophysis) which holds the place of the centrum are still distinct. The transverse extent of the bar, in proportion to the antero-posterior extent, is greater than in Man : the flattened posterior articular processes are reniform, not subcircular as in Man, and the vertebral foramina are relatively less.

5062. The axis.

Its short transverse process is perforated, but it is not bifurcate : the neural spine is pointed : the posterior articular surface of the centrum is convex transversely, slightly concave vertically. The odontoid (true centrum of the atlas) is longer, in proportion to its thickness, than in Man ; the anterior articular surfaces are narrower, the lower surface of the centrum is flatter, the spine is longer and more pointed, and the perforation in the transverse process relatively smaller than in Man. The transverse convexity of the posterior surface of the centrum is greater, and the vertical concavity less than in Man.

5063. The third cervical vertebra.

It is chiefly distinguished from the corresponding Human vertebra by the length and slenderness of its simple spinous process. The transverse process has a short oblique pleurapophysial plate.

5064. The fourth cervical vertebra.

The angles of the oblique lamelliform transverse process begin to be produced.

5065. The fifth cervical vertebra.

In this the diapophysial and parapophysial portions project distinctly from each transverse process.

5066. The sixth cervical vertebra.

In this the pleurapophysis or rudimental rib completing the perforated transverse process has not coalesced with the parapophysis ; and it has either not been ossified, or is lost.

5067. The seventh cervical vertebra.

The transverse process is represented by the diapophysis only, which is not perforated.

5068. The twelve dorsal vertebræ.

The metapophysis begins to project from the anterior angle of the diapophysis in the seventh dorsal, progressively increases in size in succeeding vertebræ, and is advanced in position close to the anterior zygapophysis in the last dorsal.

In comparing the last dorsal vertebra of the Orang with that of Man, one may notice the smaller size of the body and the shorter neural spine in the former. The metapophysis is distinctly developed in both. The neural arch in the Orang is entire posteriorly, not notched.

5069. The four lumbar vertebræ.

5070. The sacrum and coccyx, including eight vertebræ.

The three anterior of these unite with the iliac bones. Traces of the primitive separation of the costal portion of the transverse process of the first and second sacral vertebræ are still discernible. The neurapophyses of the third, fourth and fifth vertebræ are not confluent above the neural canal, which is widely open, in the fifth. The three terminal vertebræ are reduced to their central element.

5071. The sternum.

The body of the bone has consisted of four pairs of ossicles, a second pair being still ununited, but traces of the separation of the others are recognizable. In addition to these eight originally distinct elements, there is a separate manubrium and an osseous piece supporting the ensiform cartilage.

5072. The osseous parts of the thoracic pleurapophyses or 'vertebral ribs,' consisting of twelve pairs.

The first rib is less curved, and describes a smaller portion of a circle than in Man: its head is relatively larger, and is supported on a shorter neck. It has an epiphysis, as in Man. The distal portion is relatively less expanded than in Man. The other ribs chiefly differ in their more compressed form and their more gradual and equable curvature.

5073. The left clavicle.

It is less curved than in Man, and the distal end is much less expanded.

5074. The left scapula.

The coracoid element has not coalesced with the proper scapula: it contributes a portion to the glenoid articular surface, and is proportionally larger than in Man. The acromion is considerably less than in Man. The superior costa is deeper anteriorly than behind; the proportions being reversed in the Human skeleton.

5075. The left humerus.

It is imperforate at the distal end, where the epiphysis is more anchylosed than that at the proximal end. The shaft is long and slender, and is slightly twisted.

5076. The bones of the left fore-arm and hand.

In the wrist, the scaphoïdes and lunare articulate with the radius; the cuneiforme is attached by ligament to the styloid process of the ulna; the separate portion of the scaphoid is wedged between the lunare, os magnum, and trapezoïdes. The metacarpals have only half the breadth of the proximal phalanges at their middle part. The phalanges are long, bent towards the palm, and expanded at their middle.

5077. The ossa innominata.

The sutures of the constituent bones are unobliterated. There is a small superficial plate upon the cotyloid end of the pubis.

5078. The left femur.

The hemispherical head shows no pit for the ligamentum teres, which is constantly absent in this species.

5079. The bones of the leg and foot.

The fore part of the astragalus is produced obliquely downwards and inwards. The back part of the calcaneum is short and compressed. The hallux supports but one phalanx.

5080. The cranium, vertically and longitudinally bisected, of an immature Orang-utan (*Simia Satyrus*).

The deciduous dentition is in place: the crown of the first permanent true molar may be seen in its formative alveolus. The sutures between the elements of the occipital bone, between the basioccipital and basisphenoid, between the maxillaries and premaxillaries, with the other ordinary sutures, are retained; but the frontal suture had been obliterated, and the nasal bone is, as usual, single. The basisphenoid is as yet occupied only by cancellous structure, the

sinuses not being developed. The capacity of the cranium is almost equal to that in No. 5054, and is consequently relatively much greater than the nasal chamber or the bones of the face in the present immature specimen, which, in that respect, approaches nearer to the Human characteristics. But the relative capacities of the cranial and olfactory chambers are not absolutely indicative of degrees of proximity to Man in the Mammalian class, or in the Quadrumanous order. Some of the smaller species of the South American Monkeys, as, for example, the *Callithrix Pithecia,* resemble the immature Orang in the predominating capacity of the cranial chamber. This is due to a retention, with the diminutive size of the whole body, of some other immature characters. The brain of the *Callithrix* is relatively larger in proportion to the body than in the Chimpanzee and Orang, but it has a much less proportional amount of grey cerebral matter; the surface of the hemispheres being as little convoluted in the full-grown Marmoset as in the half-developed fœtus of a larger and higher species of Quadrumane. In the higher Mammalian classes the brain rapidly acquires a certain bulk by an accelerated rate of growth: in all the Quadrumana, and doubtless in a much larger proportion of the Mammalian class, the brain, at that stage of development as to bulk, bears the same large proportion to the bulk of the embryo in all the species, notwithstanding the great difference of size which may distinguish such species when arrived at maturity. The subsequent differences in the relative size of the brain depend upon the specific stature ultimately to be attained; for, the destined degree of cerebral development in a large species having once been obtained, as it is very rapidly in regard to the size of the hemispheres, the growth of the trunk, limbs and jaws afterwards proceeds without corresponding growth of the brain. These considerations must be allowed their due weight in comparing the relative size of the brain or brain-case of small and great species of the same Order of warm-blooded animals, otherwise the same mistake may be made as to the relative perfection, or standing in the group, of the smaller species with comparatively large brains, as has been made with regard to the degree of relationship of the Chimpanzee and Orang to Mankind, when judged of by the proportion of the brain and brain-case in small and immature individuals of those large and formidable species of Ape.

The great characteristic in Man arises from the great relative size of the brain and corresponding capacity of the cranium being associated with a stature which surpasses that of the largest of the Quadrumana.

Presented by Prof. Owen, F.R.S.

5081. A coloured plaster cast of the lower jaw of an adult male Orang-utan (*Pithecus Satyrus*, var. *Wurmbii*). *Purchased.*

Genus *Troglodytes.*

5082. The skeleton of an adult female Chimpanzee (*Troglodytes niger*).

The vertebral formula is:—7 cervical, 13 dorsal, 4 lumbar, 6 sacral, and 2 caudal. The pleurapophysial portion of the transverse process of the atlas is shorter than in the Orang, and has not united with the longer diapophysial division: the canal for the vertebral artery is thus not

quite circumscribed by bone: the artery afterwards pierces the neural arch on the left side and deeply grooves it on the right side. The two portions of the transverse process of the axis have coalesced and form a thick tubercle externally, surrounding the vertebral artery: this tubercle increases in breadth in the third, and in length in the fourth; in the fifth it sends a distinct tubercle from its lower part, and the answerable part forms an antroverted, obtuse, broad process in the sixth. The pleurapophysial element is wanting in the seventh, in which the diapophysis is deeply grooved below for the vertebral artery. The diapophysis of the first dorsal is suddenly increased in thickness, to receive the tubercle of the first rib. A metapophysis may be distinguished in the eleventh and twelfth dorsals, which becomes distinct from the diapophysis in the thirteenth, and projects from the outside of the prozygapophysis in all the lumbar vertebræ. The diapophyses are longest in the first and second lumbars, are shortest in the third, and are augmented in the fourth by the development of a thick anapophysis at their back part, which here articulates with the first sacral vertebra. Seven pairs of ribs directly join the sternum, which consists of five bones and an ensiform part: the fourth and fifth bones have coalesced: the manubrium, as in the Orangs, receives the first pair and part of the second pair of ribs. The acromion more resembles that of Man than the acromion of the Orang does, but the body of the scapula is longer in proportion to its breadth than in the Orang. The bones of the anterior extremity, especially those of the fore arm, are shorter than in the Orang. The humerus is imperforate at its distal end. The carpus consists of eight bones, as in Man. The thumb is relatively longer and stronger than in the Orang. The pelvis is longer in proportion to its breadth than in the Orang. The tuberosities of the ischia are expanded, flattened, and bent outwards, as in the Orang. The bones of the hind extremity are relatively longer and stronger, especially the femur, than in the Orang; but the most marked distinction between the two great anthropoid Apes is seen in the length and strength of the hallux in the Chimpanzee, which hereby makes a much nearer approach to the peculiar characteristic of the Human foot. The articulation of the tarsus with the leg still, however, favours the oblique position of the foot, and adapts it for grasping, in the Chimpanzee.

Purchased.

5083. The skeleton of a young Chimpanzee (*Troglodytes niger*).

The deciduous dentition has been acquired. The vertebral formula is :—7 cervical, 13 dorsal, 4 lumbar, and 6 sacro-caudal, but the latter series is defective. The first three sacrals have thickened costal processes for articulating with the ilium. The costal portion of the right transverse process of the sixth cervical vertebra is wanting, and seems not to have been anchylosed; its head has articulated with a parapophysis, formed partly by the centrum, partly by the base of the neural arch, upon which the anterior articular surface of the centrum is continued: neither that (hypapophysial) part of the body of the atlas which completes the ring of that vertebra, nor the portion which forms the odontoid process, have lost their individuality by the usual confluence which takes place at a later period. The coracoid elements of the scapular arch are wanting, not having coalesced with the proper scapulæ. The alveolar portion of the maxillo-premaxillary suture is already obliterated, but the nasal portion still remains, and shows that the apices of the premaxillaries articulate with the lower end of

the nasals. The squamosals articulate with the frontals* and very nearly reach the malars. Traces of the suture connecting the costal appendages of the first sacral vertebra with its body are still visible.

Purchased.

5084. The skeleton of a young Chimpanzee (*Troglodytes niger*).

The deciduous teeth have been gained and the first true molars are just appearing through the socket. The vertebral formula is :—7 cervical, 13 dorsal, 4 lumbar, and 7 sacro-caudal. The last lumbar has its diapophyses much increased in breadth to aid in the articulation of the vertebral column with the pelvis : in the adult it would probably have coalesced with the sacrum and have reduced the lumbar series to three. The alveolar portion of the maxillo-premaxillary suture is obliterated; the nasal portion remains, and shows that the apices of the premaxillaries articulate with the nasals. The coracoids are still unanchylosed to the true scapulæ.

Mus. South.

5085. The skeleton of a young Chimpanzee (*Troglodytes niger*).

The deciduous teeth, except the canines and second upper milk-molars, have come into place. The vertebral formula is :—7 cervical, 13 dorsal, 4 lumbar, and 8 sacro-caudal. The diapophyses of the last lumbar are expanded and join the ilia. The first sacral is distinguished by that junction being effected by separate costal elements. The sutures of similar elements may be discerned in the succeeding sacral vertebræ. The squamosals articulate with the frontals, but by a smaller proportion than in the preceding skeleton.

Mus. Brookes.

5086. The cranium and portions of the lower jaw of an adult male Chimpanzee (*Troglodytes niger*).

The mature dentition has been fully acquired and moderately worn. The maxillo-premaxillary suture is obliterated, as are likewise most of the sutures of the cranium. The basioccipital and basisphenoid are confluent. The calvarium has been detached, and the section shows the extension of the mastoid cells into the squamosal. The foramen ovale is entirely circumscribed by the alisphenoid. The clinoid processes are well developed, and the posterior clinoid plate is perforated.

Presented by Captain Harris.

The following, to No. 5170 inclusive, are parts of the same skeleton of an adult male Chimpanzee (*Troglodytes niger*) :—

Purchased.

5087. The skull.

The roots of the teeth have been exposed on the right side of both jaws. The large canines characteristic of the sex have been fully acquired, but the left last true molar has not

come into place in the upper jaw. The mature dentition, though in all its principal characters strictly Quadrumanous, yet, in the minor particulars in which it differs from the dentition of the Orang, approaches nearer the Human type. In the upper jaw the middle incisors are smaller, the lateral ones larger than those of the Orang; they are thus more nearly equal to each other: nevertheless the proportional superiority of the middle pair is greater than in Man, and the proportional size of the four incisors both to the entire skull and to the other teeth is considerably greater. Each incisor has a prominent posterior basal ridge, and the outer angle of the lateral incisors is rounded off as in the Orang. The diastema between the incisors and the canine on each side is as well-marked in the male Chimpanzee as in the male Orang. The crown of the canine, passing outside the interspace between the lower canine and premolar, extends a little below the alveolar border of the under jaw when the mouth is shut: the character, therefore, which had been deemed generic, 'apices of canines lodged in intervals of the opposite teeth, when the mouth is closed,' is applicable only to the female, and does not distinguish the male *Troglodytes* from *Pithecus*. The upper canine of the male *Troglodytes niger* is conical, pointed, but more compressed than in the Orang, and with a sharper posterior edge; convex anteriorly, becoming flatter at the posterior half of the outer surface, and concave on the corresponding part of the inner surface, which is traversed by a shallow longitudinal impression: a feeble longitudinal rising and a second linear impression divide this from the convex anterior surface, which also bears a longitudinal groove at the base of the crown. The canine is rather more than twice the size of that in the female. Both premolars are bicuspid; the outer cusp of the first and the inner cusp of the second being the largest, and the first premolar consequently appearing the largest on an external view. The difference is less marked in the female. The anterior external angle of the first premolar is not produced as in the Orang. In Man, where the outer curve of the premolar part of the dental series is greater than the inner one, the outer cusps of both premolars are the largest: the alternating superiority of size in the Chimpanzee accords with the straight line which the canine and premolars form with the true molars.

The true molars are quadricuspid, relatively larger in comparison with the bicuspids than in the Orang: the last is the smallest by the feeble development of the two hind cusps. In the first and second molars a low ridge connects the antero-internal with the postero-external cusp, crossing the crown obliquely, as in Man. There is a feeble indication of the same ridge in the unworn molars of the Orang; but the four principal cusps are much less distinct, and the whole grinding surface is flatter and more wrinkled, than in the Chimpanzee. A low ridge girts the base of the antero-internal cusp of each of the upper true molars in the male Chimpanzee: it is less marked in the female. The premolars as well as molars are severally implanted by one internal and two external fangs, diverging but curving towards each other at their ends as if grasping the substance of the jaw.

In the lower jaw the lateral incisors are broader than the middle ones, but have their outer angle rounded off; they are all much larger and less vertically implanted than in Man. The lower canines are two inches in length, including the root; the enamelled crown is three-fourths of an inch in length, and two-thirds of an inch across the base; it is conical and trihedral; the outer and anterior surface is convex, the other two surfaces are flattened or sub-concave, and converge to an almost trenchant edge directed inwards and backwards; a ridge

separates the convex from the antero-internal flat surface; both this and the posterior surface show slight traces of a longitudinal rising at their middle part. The lower canine shows the same relative superiority of size as the upper one, compared with that in the female Chimpanzee: the canine almost touches the incisor, but is separated by a diastema one line broad from the first premolar. This tooth is larger externally than the second premolar, and is twice the size of the Human first premolar; it has a subtrihedral crown, with the anterior and outer angle produced forward, slightly indicating the peculiar feature of the same tooth in the Baboons. The summit of the crown terminates in two sharp trihedral cusps, the outer one rising highest, and the second cusp being feebly indicated on the ridge extending from the inner side of the first: the crown of the first has a thick ridge at the inner and posterior part of its base. The second premolar has a subquadrate crown, with the two cusps developed from its anterior half, and a third smaller one from the inner angle of the posterior ridge. Both the lower premolars are implanted by two antero-posteriorly compressed divergent fangs, the anterior one being the largest. The three true molars are almost equal in size, the first being very little larger than the last, which is the only molar as large as the corresponding tooth in the black varieties of the Human subject, in most of which, especially the Australians, the true molars attain larger dimensions than in the yellow or white races. The four principal cusps, especially the two inner ones, of the first molar of the Chimpanzee are more pointed and prolonged than in Man: a fifth small cusp is developed behind the outer pair, as in the Orangs and the Gibbons, but is less than that in Man. The same additional cusp is present in the second molar which is seldom seen in Man. The crucial groove on the grinding surface is much less distinct than in Man, not being continued across the ridge connecting the anterior pair of cusps in the Chimpanzee. The crown of the third molar is longer antero-posteriorly from the greater development of the fifth posterior cusp, which however is rudimental in comparison with that in the Semnopitheques and Macaques. All the three true molars are supported by two distinct and well-developed antero-posteriorly compressed, divergent fangs, longitudinally excavated on the sides turned towards each other. The molar series in both jaws forms a straight line, with a slight tendency in the upper jaw to bend in the opposite direction to the well-marked curve which the same series describes in the Human subject.

5088. The atlas.

There is a short process from the back part of the hypapophysis: the vertebral artery pierces the transverse process lengthwise and then perforates the neural arch: the costal part of the left transverse process has not been ossified: that process is represented by a short parapophysis and a long diapophysis, the vertebral foramen being, nevertheless, complete. A small ridge represents the neural spine. In comparison with the Orang, the breadth of the atlas exceeds its antero-posterior diameter chiefly by the length of the diapophysial part of the transverse process: it thus more nearly resembles that of Man in its general shape. It likewise resembles it more in the minor breadth and greater length of the part representing the body, in the larger and more definite surface on the upper part for the articulation with the odontoid process, and in the greater breadth and more produced margins of the hinder articular processes.

5089. The axis.

The transverse processes are short and terminate simply and obtusely: the neural spine is trifid, having an anterior ridge and two terminal tuberosities directed outwards and a little backwards. The body is deeper behind in proportion to its breadth than in the Orang, and the vertical concavity equals the transverse convexity of that articular surface: the neural canal is less contracted above: the anterior zygapophyses are larger and better defined. In all these respects the Chimpanzee approaches nearer to Man than the Orang does.

5090. The third cervical vertebra.

The fore part of the bases of the neurapophyses are produced forwards beyond the centrum and complete the transverse concavity for the reception of the backwardly produced body of the axis. This surface is deeper in proportion to its breadth than in the Orang, and in this respect approaches nearer to that of Man. The vertebral arterial foramina are larger, the neural canal wider, and the anterior zygapophyses better defined, than in the Orang. The body of the vertebra is longer in proportion to its breadth than in the Orang, and the vertical concavity of the hinder surface is deeper. The costal portion of the transverse process is compressed and slightly produced downwards, forming an obtuse angle distinct from the more acute diapophysis which is prolonged outwards and backwards. The neural spine is subtrihedral, slender, obtusely pointed, and of equal vertical extent with the neural canal.

5091. The fourth cervical vertebra.

This vertebra, in the greater depth and minor breadth of the body, and in the larger relative size of the neural canal and of the vertebral arterial foramina, repeats the same differences from that of the Orang, and the same resemblances to that in Man, as the foregoing vertebra does. The neurapophyses still form the sides of the anterior concavity of the body. The costal ridge is equally distinct; the diapophysis is longer and the neural spine is a little longer than in the preceding vertebra.

5092. The fifth cervical vertebra.

The same differences, as compared with that in the Orang, are repeated in this vertebra. The costal portion of the transverse process is more produced. The neural spine is both longer and stronger. The diapophyses are somewhat less.

5093. The sixth cervical vertebra.

This vertebra differs from the fifth in a slight increase of breadth and prominence of the pleurapophysis and in a diminution of the diapophysis: the centrum is more expanded posteriorly: the neural spine is longer and thicker.

5094. The seventh cervical vertebra.

The costal portions of the transverse process are reduced to an osseous filament, which completes the lower boundary of the vertebral arterial canal. The diapophysis is much longer and thicker than in the sixth. The transverse extent of the centrum continues to increase, as also the antero-posterior breadth of the neurapophyses. The neural spine increases in breadth and slightly in length.

5095. The first dorsal vertebra.

The bases of the neurapophyses, instead of being produced forwards, have those angles as it were truncated, to form the articulation with the heads of the first pair of ribs. The breadth of the centrum is augmented, and also, in a more especial degree, that of the diapophysis, which is excavated below for articulation with the tubercle of the rib. The neural spine is increased in antero-posterior extent, but not in length.

5096. The second dorsal vertebra.

The centrum is larger: the anterior zygapophyses are more approximated and distinct from the diapophyses, which thereby appear to be longer: the neural spine is somewhat longer.

5097. The third dorsal vertebra.

It differs from the second in the narrower anterior neural emargination, in the somewhat shorter diapophyses, and longer neural spine. The accessory tubercle is more distinct upon the diapophysis.

5098. The fourth dorsal vertebra.

In this the neural spine is somewhat broader at its truncated extremity.

5099. The fifth dorsal vertebra.

It closely resembles the preceding.

5100. The sixth dorsal vertebra.

5101. The seventh dorsal vertebra.

5102. The eighth dorsal vertebra.

5103. The ninth dorsal vertebra.

The spinous process is thicker transversely, and more expanded at the summit. The body also presents a more marked increase.

5104. The tenth dorsal vertebra.

It shows an increase in the size of the body, and of the neural spine. The posterior costal surface is replaced by a non-articular tubercle.

5105. The eleventh dorsal vertebra.

The whole vertebra is increased in size, but the di- and zyg-apophyses are not so in the same degree. There is only the anterior pair of costal surfaces upon the centrum.

5106. The twelfth dorsal vertebra.

This is characterized by a marked increase of the antero-posterior extent of the neural spine. The metapophysis is more distinctly recognizable, projecting forwards from the diapophysis.

5107. The thirteenth dorsal vertebra.

In its principal characters it resembles the last dorsal of Man; for instance, in the distinct and well-developed metapophyses, which are thicker and longer in the Chimpanzee; also in the narrower and longer posterior part of the neural arch, concomitant with the change of position of the posterior zygapophyses. The diapophysis still shows, in the Chimpanzee, an articular surface for the tubercle of the thirteenth rib. The neural spine is longer and larger than in Man, especially in its antero-posterior extent.

5108. The first lumbar vertebra.

This vertebra, which answers to the second lumbar vertebra in the Orang and Man, differs from both in the superior length and size of the neural spine. The metapophyses project from the upper and outer part of the anterior zygapophyses, from which they are separated by a narrow groove. There is a feeble rudiment of anapophysis from the back part of the long and depressed diapophysis.

5109. The second lumbar vertebra.

The metapophyses still continue to be separated by a groove from the anterior zygapophyses. The neural spine is more expanded at its broad flattened termination. The centrum is somewhat augmented in size.

5110. The third lumbar vertebra.

In this vertebra the diapophysis is shorter and thicker, and the anapophysial tubercle larger and more distinct at its back part. There is a slight increase in the size of the centrum.

5111. The sacrum.

The first vertebra of this is homologous with the last lumbar in Man, and with the same vertebra in the skeleton of the female Chimpanzee, No. 5082, where, however, although free, it exhibits a similar modification to the present by a sudden increase of size of the transverse process, due chiefly to the development of its backwardly projecting or anapophysial part. The second sacral vertebra does not exceed the first in breadth; the rest slightly diminish to the fifth. The neural arch is complete in each, and the spinous process is developed from all but the last, the four posterior spines being confluent. The metapophyses are developed from the four anterior sacrals: the three anterior ones join the iliac bones.

5112. The three coccygeal vertebræ.

The first has rudimental neurapophyses answering to what have been termed the 'shoulders of the os coccygis' in Anthropotomy, and a pair of short, depressed diapophyses: the two terminal vertebræ consist of the centrum only, and are confluent.

5113. The manubrium sterni and first pair of thoracic ribs.

The ribs are shorter and their neck relatively longer than in the Orang, and they are more curved. The manubrium sterni is more compressed superiorly, where, instead of being flattened, it is rounded off, and presents two low and broad tuberosities: it also contracts more towards its lower end, and is longer in proportion to its breadth. In all these characters it approaches, in form, nearer to the same part in Man.

5114. The second pair of thoracic ribs.

5115. The seven succeeding pairs of thoracic ribs.

5116. The tenth pair of ribs.

The articular tubercle is well marked.

5117. The eleventh pair of ribs.

These have an articular tubercle well marked, but nearer the head than in the foregoing pair.

5118. The twelfth pair of ribs.

In this pair, also, the articular tubercle is distinctly developed, and is a little nearer the head. The rib is rather shorter than the preceding, but has the same degree of curvature.

5119. The thirteenth pair of ribs.

These, also, although one-third shorter than the preceding pair, and proportionally thinner, retain a distinct articular tubercle and neck.

5120. The five pieces composing the body of the sternum.

They are thicker and narrower than in the Orang, and had been ossified each from a single centre: in the two upper pieces the sides are flat, like the front and back surfaces, from which they are separated by sharp margins.

5121. The right clavicle.

This is relatively shorter than in the Orang; the sigmoid curvature is more marked, the sternal end is thicker, and the acromial end broader; in all which differences it approaches nearer to the form of the Human clavicle.

5122. The right scapula.

It differs from that of the Orang in being longer in proportion to its breadth, in the wider expanse of the supraspinal fossæ, especially at its back part, in the deeper suprascapular notch, in the broader acromion, and in the longer coracoid which is nearer the glenoid cavity. The subscapular fossa is deeper opposite the spine, and the infraspinal surface is more concave.

5123. The left scapula.

5124. The left humerus.

This is shorter and stronger than in the Orang; both tuberosities are more developed, especially the inner one, and the bicipital groove is deeper: the antero-internal surface, bounded outwardly by the deltoidal ridge, is flatter than in the Orang: the supinator ridge commences above the middle of the shaft, the true character of which is well marked. The trochlear prominence of the distal articulation is more developed, and the canal which separates it from the ball for the radius is both deeper and wider. There are two small medullary foramina at the fore and inner part of the middle third of the shaft leading to canals which extend obliquely distad.

5125. The right humerus.

It has been fractured and united with much shortening and thickening; there is also evidence of ulceration, concomitant, doubtless, with discharge of dead portions of fractured bone. This specimen has been longitudinally bisected.

5126. The left radius.

It differs from that of the Orang in being much shorter in proportion to its breadth, and presents a more marked sigmoid curvature; the borders of the circular proximal end are more produced; the trihedral character of the distal half is better marked. The distal end is more suddenly expanded, and the grooves for the extensor tendons are deeper and better defined. The anterior angle of the ulnar surface is more produced, and that surface is less depressed. The medullary canal commences near the junction of the proximal with the middle third, at the fore part of the bone, and inclines proximad.

5127. The left ulna.

This differs from the corresponding bone in the Orang, and approaches that of Man in the proportion of its length and thickness. The outer or ulnar division of the great sigmoid cavity is less developed than in the Orang, and its margin is more extensively interrupted at its middle part: the radial division of the same cavity extends more nearly to the back part of the olecranon. The lesser sigmoid cavity is more nearly semicircular than in the Orang. The ridge continued a short way downwards from the inner and ulnar angle of the great sigmoid cavity is sharply defined, but the fossa which it bounds is much less deep than in the Orang. The interosseous ridge is not marked, the bone being there rounded off in the Chimpanzee. The styloid process is better developed than in the Orang.

5128. The right radius.

This bone has been fractured at its middle part and united with thickening, but the ulna, having, by means of its terminal attachments to the radius, acted as a splint, there has been no shortening as in the humerus.

5129. The right ulna.

5130. The right scaphoïdes.

It is a single bone, not divided, as in the Orang. The radial surface is elongated, undulating, nearly flat, and forms a right angle with the subquadrate trapezial convexity: they are separated by a narrow groove, but both are continued into the concavity for the magnum. The ulnar angle of the bone is produced into a well-marked tuberosity.

5131. The lunare.

5132. The cuneiforme.

5133. The trapezium.

The outer end of the bone between the surface for the scaphoides and that for the thumb is produced into a well-marked tubercle, and there is also a tuberosity on the back part of the bone.

5134. The trapezoïdes.

5135. The os magnum.

The surface for the middle metacarpal is much produced antero-posteriorly, but is emarginate on each side opposite its middle part; the outer notch being the deepest, and leading to a deep irregular fossa next the trapezium.

5136. The unciforme.

5137. The metacarpal of the index of the right hand.

It is shorter and stronger than in the Orang-utan.

5138. The metacarpal of the third digit.

It is rather longer than that of the index. The proximal articulation is notched on each side.

5139. The metacarpal of the fourth digit.

This is a little shorter than the preceding. The proximal articulation presents a central depression, and is indented upon the radial side by a notch which divides the surface articulating with the middle metacarpal. The opposite surface for the fifth metacarpal is single and entire.

5140. The metacarpal of the fifth digit.

This is shorter and more slender than the preceding.

5141. The right os innominatum.

It is longer in proportion to its breadth than in the Orang-utan. The expanded part of the ilium is slightly concave anteriorly, but in the Orang it is plane. The spine of the ischium is parallel with the middle of the obturator foramen, but in the Orang it is parallel with the upper border of that foramen. The symphysis pubis is longer than in the Orang. The proportions of the greater to the lesser ischiatic notch are, in the Chimpanzee, more like those in Man.

5142. The left os innominatum.

5143. The right femur.

It is longer and stronger than in the Orang-utan, and differs more markedly by the pit upon its head for the ligamentum teres: both trochanters are relatively larger: the neck is longer, thicker in proportion to the head, and passes off at a less obtuse angle with the shaft. The shaft is slightly bent forwards; it is not straight, as in the Orang: the condyles are more expanded, especially the inner one, which is proportionally broader and more convex behind. The medullary arterial canal enters the back part of the shaft near the middle and inclines obliquely upwards.

5144. The left femur.

In both femora the trochanterian pit is larger and deeper than in the Orang-utan; and in all the characters above cited there may be discerned a manifestedly nearer approach to the Human structure.

5145. The left tibia.

It is a little longer than in the Orang-utan; the proximal end is more expanded, and the inner border more thickened. The fibular facet is nearer the articular surface for the outer condyle. The shaft is more bent forwards and more compressed: the inner malleolus is more produced than in the Orang-utan.

5146. The left fibula.

This is a stronger bone than in the Orang-utan.

5147. The right astragalus.

It differs from that of the Orang-utan in the posterior prominence being narrower and more deeply grooved, in the outer calcaneal concavity being much longer, and in the outer angle supporting the fibula being more produced.

5148. The right calcaneum.

It differs from that of the Orang-utan in the greater thickness and extent of the hinder prominence, in the greater length of the surfaces for the astragalus, in the greater development of the outer tuberosity, and in the greater depth of the surface for the cuboid.

5149. The right naviculare.

It differs from that of the Orang-utan in its greater size, especially in the transverse as compared with the antero-posterior extent, and in the much greater extent of the surface for articulating with the entocuneiforme.

5150. The right entocuneiforme.

This is larger than the corresponding bone in the Orang-utan; but the increase is more in the antero-posterior than in the transverse direction.

5151. The mesocuneiforme.

The base of the wedge is flatter than in the Orang-utan.

5152. The right ectocuneiforme.

Its antero-posterior extent is greater in proportion to its transverse than in the Orang-utan, and the base of the wedge is flatter.

5153. The right cuboïdes.

This bone is larger, transversely, than in the Orang-utan.

5154. The left astragalus.

5155. The left calcaneum.

5156. The left naviculare.

5157. The left entocuneiforme.

5158. The left mesocuneiforme.

5159. The left ectocuneiforme.

5160. The left cuboïdes.

5161. The metatarsal of the right hallux.

It is longer, much thicker, and more expanded at its proximal extremity, than the same bone is in the Orang-utan.

5162. The right second metatarsal.

It is shorter than in the Orang-utan, but is thicker, more expanded at the proximal end, and less so at the distal end.

5163. The right third metatarsal.

It presents corresponding differences as compared with that in the Orang-utan.

5164. The right fourth metatarsal.

5165. The right fifth metatarsal.

The proximal end is larger than in the Orang-utan.

5166. The metatarsal of the left hallux.

5167. The left second metatarsal.

5168. The left third metatarsal.

5169. The left fourth metatarsal.

5170. The left fifth metatarsal.

5171. The skull, with the deciduous dentition, of a young Chimpanzee (*Troglodytes niger*).

The alveolar portion of the maxillo-premaxillary suture is obliterated, but the palatal and nasal portions remain. The apices of the premaxillaries in this instance do not reach the nasals. The squamosals articulate with the frontals. The elements of the occipital are still distinct. In a Human skull with a corresponding stage of dentition the exoccipitals have become confluent with the superoccipital, but not with the basioccipital, and only a small portion of the palatal part of the maxillo-premaxillary suture remains.

This is the specimen alluded to by Mr. Lawrence when treating of the intermaxillary bone, in the fourth chapter of his "Lectures on the Natural History of Man," 8vo, 1819, p. 174.

Presented by the Rt. Hon. Earl Spencer.

The following, to No. 5177 inclusive, are parts of the same skeleton of a young Chimpanzee (*Troglodytes niger*) :—

Purchased.

5172. The skull.

The deciduous teeth are retained and the first permanent molar has been acquired. The palatal and nasal portions of the maxillo-premaxillary sutures remain and show the apices of the premaxillaries articulating with the nasals. The elements of the occipital are still unanchylosed. The squamosals articulate with the frontals. The calvarium has been detached. There is no cerebellar fossa in the petrosal. The foramen ovale is not quite circumscribed by the alisphenoid. The germ of the large permanent median incisor is exposed on one side of both upper and lower jaws.

5173. The bones of the trunk, with the scapular and pelvic arches.

The vertebral formula is :—7 cervical, 13 dorsal, 4 lumbar, and 7 sacro-caudal. The first three sacrals articulate with the ilia, as does also the last lumbar by means of a thickened diapophysis.

5174. The bones of the right pectoral extremity.

5175. The bones of the left pectoral extremity.

5176. The bones of the right pelvic extremity.

5177. The bones of the left pelvic extremity.

5178. The skeleton of an adult male Great Chimpanzee, or Gorilla (*Troglodytes Gorilla*).

This species, discovered by Dr. Savage in the Gaboon District, west coast of tropical Africa, in 1847*, not having been known to Cuvier, nor having been described in the 'Ostéographie' of De Blainville, and being the species of Quadrumanous animal that makes the nearest approach to Man, calls for the following description of the skeleton, which is at present unique in Great Britain.

Comparison of the Skull of the Troglodytes Gorilla *with that of the* Troglodytes niger.

Independently of the superiority of size of the *Tr. Gorilla* over the *Tr. niger* (No. 5082), the skull presents well-marked differences of form, differences in the development and proportions of the intermuscular ridges, in the disposition of certain sutures and in the structure and proportions of certain teeth. Compared in profile, the skulls of both species present the striking difference from the Orangs (Nos. 5050 & 5051) in the prominence of the superorbital ridge; but the temporal ridges, after their junction upon the frontal, rise, in the *Tr. Gorilla,* into a strong and lofty sagittal crest, which is continued to the lambdoidal crest, and the great extent of the lambdoidal crest masks the posterior convexity of the occiput in *Tr. Gorilla.* The zygomatic arch is proportionally much stronger in the large Chimpanzee, and also differs from that in *Tr. niger* by the squamosal part being of equal depth with the malar part, and by its having its upper border convex or produced into an angle instead of being straight or slightly concave. The alisphenoid is longer and narrower in *Tr. Gorilla,* and contributes less to the back wall of the orbit than in *Tr. niger,* in which it forms a much smaller proportion of that part than in Man. The spheno-maxillary fissure is not only larger in *Tr. Gorilla,* but is narrower and more vertical, not angularly bent as in *Tr. niger.* The extent of the premaxillary bones below the nostril is not only relatively but absolutely less in *Tr. Gorilla,* and the profile of the skull less convex at that part, or less 'prognathic,' than in *Tr. niger.*

More important differences appear on comparing the two skulls in a front view. The breadth of the premaxillaries and of the incisor teeth is the same in both, whilst in all other dimensions the *Tr. Gorilla* greatly surpasses the *Tr. niger*: this is seen in the height of the sagittal crest, the thickness of the great superorbital bar of bone, the prominence of the ect-

* See 'Transactions of the Zoological Society,' 4to, vol. iii. p. 389.

orbital walls, and of the inferior tumid malar boundaries of the orbits. But the decisive specific character is given by the form and connections of the nasal bones: these have coalesced together in *Tr. Gorilla* as in *Tr. niger*, but less completely, a linear indication of the median suture remaining along the exterior surface: the coalesced upper portions of the nasals ascend higher above the nasal processes of the maxillary than in *Tr. niger*, become contracted between those processes and there project slightly, their median coalesced margins being inclined forwards, and thus offering a feature of approximation to the Human structure, which is very faintly indicated in the skull of the *Tr. niger* (No. 5087). The nasal bones in the larger species expand at their lower halves, terminate in a slight point below, and articulate laterally not only with the maxillary bones, but with an expanded superior portion or dismemberment of the premaxillaries. A considerable extent of the sutures uniting these bones with the maxillaries remains in the *Tr. Gorilla*, but they are obliterated in the *Tr. niger*.

In the specimen of the skull of the immature *Tr. niger* (No. 5171), with only the twenty deciduous teeth in place, the maxillo-premaxillary sutures, still traceable at the sides of the nasal aperture as well as on the palate, show that each premaxillary bone terminates above in a point which does not reach the nasals. The inferior or alveolar part of the premaxillaries is shorter and less prominent in *Tr. Gorilla* than in *Tr. niger*, and in that respect the larger species deviates less from Man. The anterior surface of the premaxillaries is more irregular or undulated by the prominent sockets of the incisors in *Tr. niger* than in *Tr. Gorilla*. The nostril is a wider and more regular ellipse in *Tr. Gorilla*; it is contracted above in *Tr. niger*, which gives it an ovate form with the great end downwards, and thus it more resembles the form of that aperture in Man.

The orbits have a more subquadrate form, with the angles rounded off, in *Tr. Gorilla* than in *Tr. niger*; but their periphery is less sharply defined, especially below, than in *Tr. niger*. The æthmoidal cells are more swollen out, giving the interorbital space a greater breadth below and the lacrymal fossæ a more anterior aspect in *Tr. Gorilla*.

The infraorbital canal is open from its posterior commencement to where it perforates the lower border of the orbit, and it issues upon the face relatively lower and further from the orbit in the *Tr. Gorilla*. The whole nasal bone is relatively longer, and the distance from the orbits to the external nostril greater in the *Tr. Gorilla*. The malar bone is more convex outwardly, and is more remarkable for its vertical extent: it is flatter and developed more transversely in the *Tr. niger*. The larger proportional size of the canines in *Tr. Gorilla* impresses a corresponding difference upon the alveolar part of the maxillary bone in that species.

In comparing the skulls of the two species by a view of their base, the first remarkable difference is the broad, flat, or slightly concave superoccipital surface of the larger species as compared with the uniformly convex character of the same part in the *Tr. niger*: the difference is due to the much thicker and broader lambdoidal ridge in the larger species, which prolongs the surface far beyond the cerebellar fossa, and gives the condyles and foramen magnum a rather more advanced position as compared with the *Tr. niger*. The next character, which is also a more anthropoid one, though explicable in relation to the greater weight of the skull to be poised upon the atlas, is the greater prominence of the mastoid processes in the *Tr. Gorilla*, which are represented by only a rough ridge in the *Tr. niger*. These protuberances are cellular, and with a very thin outer layer of bone in the *Tr. Gorilla*. The

lower surface of the long tympanic or auditory process is smooth and flat, or slightly concave, in *Tr. niger*, and developes a slight tubercle anterior to the stylohyal pit: in the *Tr. Gorilla* the same process is more or less convex below, and developes a ridge, answering to the vaginal process, on the outer side of the carotid canal.

The processes posterior and internal to the glenoid articular surface are better developed, especially the internal one in the *Tr. Gorilla*, than in the *Tr. niger*: the ridge which extends from the ecto-pterygoid along the inner border of the foramen ovale terminates in *Tr. Gorilla* by an angle or process answering to that called 'styliform' or 'spinous' in Man, but of which there is no trace in the *Tr. niger*.

The palate is narrower in proportion to its length in the *Tr. Gorilla*, but the premaxillary portion is relatively longer in *Tr. niger*. Two anterior palatine foramina, one on each side the almost confluent incisive foramina, are more constant and conspicuous in *Tr. Gorilla*: the posterior palatine foramina are nearer the posterior border of the bony palate in the *Tr. niger*. The pterygoid fossæ are relatively deeper and longer in the *Tr. niger*. The posterior nares are deeper or longer in proportion to their breadth in *Tr. Gorilla*; and the posterior border of the bony palate is emarginate at its middle, instead of being produced backwards into a point as in *Tr. niger*.

As decisive marks of specific distinction as any of those deducible from the forms, proportions and connections of the bones are presented, in the *Tr. Gorilla*, by the greater relative dimensions of the canine and molar teeth as compared with the incisors, and by the more complex grinding surface of the last molar and its equality of size with the first molar. The transverse extent of the four incisors of the upper jaw is as great in the *Tr. niger* as in *Tr. Gorilla*: the interspace between the right and left canines is even greater, as is also the extent of the diastema between the canines and the incisors of the upper jaw in *Tr. niger*. The median incisors are, however, larger in proportion to the lateral ones in *Tr. Gorilla*.

The crown of the canine is more inclined outwards in *Tr. Gorilla*; the anterior inner groove is much deeper; the base of the posterior trenchant border is more produced; the ridge between the two inner grooves is more prominent, and the hinder inner groove is continued more decidedly upon the fang in the *Tr. Gorilla*.

The last molar of the *Tr. Gorilla* is more nearly equal to the penultimate one than in *Tr. niger*, being only slightly narrower across the back part: it has the posterior outer cusp, and particularly the posterior inner cusp, much more distinctly developed, and there is a distinct connecting ridge between the posterior outer and the anterior inner cusps, as in the first molar, and which ridge is not developed in the last molar of the *Tr. niger*.

On a review of the differences pointed out in the preceding comparisons, the stronger zygomatic arches, with the more developed sagittal and lambdoidal crests, might be viewed as adaptive developments concomitant on the presence of larger canines, and indicative of a larger and more powerful variety of Chimpanzee; but the larger proportional molars and the smaller proportional incisors, the more equal and complex ultimate molar tooth, together with the prominence of the nasal bones at their median line of coalescence, and above all, the reappearance of the premaxillaries upon the face above the nostril with their longer enduring sutures, constitute a series of differential characters of more importance than such as are due

to greater bulk or activity of muscles, and not to be explained by the operation of external circumstances favouring greater general development of size and power.

Comparison of the Skull of the male Troglodytes Gorilla *with that of a male Negro.*

In the side view the most remarkable difference is the small proportional size of the cranium, as defined by the superorbital ridge and the zygomatic arch from the facial part of the skull, in the Gorilla; notwithstanding the presence of the strong sagittal and lambdoidal cristæ which are superadded to the cranial part of the skull, and prolong its extent upwards and backwards beyond the proper walls of the brain-case in this great Ape. The temporal ridge, arching upwards and backwards, and blending with its fellow to form the parietal crest, defines the upper contour of the cranium in the Gorilla, the intercepted part of the frontal sinking below the converging ridges and forming a concavity in their interspace. In Man the frontal swells out into a broad convexity between those ridges, which are feebly defined by the slight subsidence of the muscular temporal surface below the level of the rest of the frontal, and this indication of a ridge usually disappears before it reaches the coronal suture, where nearly the whole upper surface of the cranial dome intervenes between such indications. The rudiment of the lambdoidal ridge in Man curves with the convexity upwards below the suture to terminate in the occipital spine or tubercle, a free tract of bone more than an inch in breadth dividing the lambdoidal from the temporal ridges, and being continued between them upon the mastoid process. In the Gorilla the enormous lambdoidal crest, blended with the back part of the temporal ridge, curves with the concavity upwards, as it extends from the mastoid, obliterating the suture, to join the hind end of the sagittal crest; and the lambdoidal crest terminates the contour of the cranium behind as the sagittal crest does above. In Man the parietal dome rises high above, and the occiput swells out below, the rudimentary lambdoidal ridge; whilst the larger and longer mastoid process, projecting downwards and extended forwards beneath the meatus auditorius externus, supports the vaginal plate of the tympanic or auditory process: but in the Gorilla the tympanic or auditory process, presenting the form of a semicylindrical tube, is wholly in advance of the shorter mastoid process, and has no vaginal process at its outer end. The postglenoid process of the squamosal (middle root of the zygoma) is relatively thicker and longer, but more obtuse in the Gorilla. The zygoma is not only much stronger, but the squamosal and malar portions have different forms and proportions in the Gorilla; the squamosal is as deep and as long as the malar part, instead of being shallower and longer as in Man; and its upper border rises in the Gorilla into an angular form: the malar portion is accordingly longer, and does not decrease in depth after leaving the body of the bone as in Man. The posterior border of the frontal process of the malar is slightly concave or nearly straight in the Gorilla; it forms a strong sigmoid curve in Man, convex backwards at its upper half. The superorbital ridge projects very slightly beyond the slope of the frontal between the external angle and the prominent sinus even in the lowest Negro or Australian skull: the prominence of the whole superorbital ridge, which is the characteristic of the genus *Troglodytes,* reaches its maximum in the present great species, and forms a well-marked distinction in the comparison of its skull with that of Man. The interorbital part of the ridge, however, projects more suddenly over the root of the nasal in the Ethiopian and especially Australian skulls than in the

Gorilla. But even in the low race of Man selected for the comparison, the development of the prosencephalon carries the interorbital part of the frontal forward so as to bring the orbital cavity into view in advance of its lateral malar boundary; but no part of that cavity is seen in the same direct side view in the Chimpanzee. The prominent nasal bone forms part of the anterior outline below the overarching frontal in Man; but notwithstanding the characteristic projection of the nasal in the great Gorilla, the thick swollen external wall of the orbit shuts it out of view. Below the malar the alveolus of the great canine in the maxillary, and then the prominent premaxillary and incisors, complete the anterior contour in the Gorilla; but in Man the concave maxillary border of the external nostril leads from the nasal to the short and slightly projecting anchylosed premaxillary bone, supporting the almost vertical crowns of the incisors. The great cuspidate canine, the interval dividing it from the incisors, the superior size of the first premolar over the second, the prominent double socket for the two diverging external fangs of each premolar, and the equal-sized true molars, are all distinctive characters in the Gorilla of the most decisive nature in contrast with the specific peculiarities of the dentition in Man. In the direct side view of the human skull, a part only of the crown of the outer incisor and scarcely any of the inner incisor can be seen projecting beyond the canine; whilst the whole crown of the outer incisor and the more prominent part of the inner incisor extend into view beyond the canine in the Gorilla. The whole alveolar border of the upper jaw extends much further below the base of the cranium in the Gorilla than in Man, in whom the superior depth of the brain-case brings the mastoid process almost on a level with the alveoli of the maxillary bone. The relatively shorter, deeper, subquadrate form of the upper jaw is also a marked characteristic of Man. In the Gorilla, although the alveolar border forms a right angle with the posterior border of the upper jaw, the long anterior border slopes forwards towards the lower border at an acute angle, and to the same degree departs from its parallelism with the posterior border. The spheno-maxillary fissure is longer, narrower and less curved in the Gorilla than in Man: the ectopterygoid is shorter, but the antero-posterior extent of the base of this process is relatively much greater. The styliform process of the sphenoid terminates the arch behind the pterygoid in both; but the vaginal process with its anchylosed stylohyal is a character quite peculiar to the human skull.

Another feature peculiar to Man is the arch or upward curve of the basal contour of the cranium between the occipital condyles and the lower end of the posterior border of the vomer, and the near approach to parallelism of the line of the occiput below the superior transverse ridge with the line of the teeth. The difference in the plane of the occipital foramen of the human skull from that in the Gorilla is as well-marked in the lowest as in the highest races of Man. Such is the enormous development of the facial part of the skull as compared with the cranial part in the Gorilla, that, in taking a direct front view with the nasal cavity as the centre of the perspective plane, little more of the cranium is visible than that which forms the base of the sagittal crest. The thick superorbital ridge and outstanding malars and maxillaries compose the major part of the plane, and the prognathic premaxillaries and incisors with the great canines and their tumid alveoli complete, with the broad and deep lower jaw, the view below. In Man the upper half of the corresponding view is formed by the frontal part of the cranial dome; the expanded sides of that dome are visible

behind and beyond the outer walls of the orbits, and the mastoid processes come into view behind the angles between the malars and maxillaries. Of the regular arch formed by the equable teeth only the hinder molars are excluded from view, and not always these in the White races. The prominence of the entire nasal bones; the relatively larger, broader, and more sharply defined orbits; their comparatively slender outer boundaries; the concavity of the surface which descends from the orbit to the alveoli of the premolars in contrast with the convexity of the same part in the Gorilla; the vertical plane of the nasal aperture (which slopes from above downwards and backwards in more favoured races of Man); and the slight prominence of the premaxillaries (which are vertical in well-formed Caucasian skulls), are eminent characteristics of the human species in this comparison. In the orbits of the Gorilla the lacrymal bones are either separated from the 'ossa plana' or are united to them in a much smaller proportion than in Man; and the orbital plate of the lacrymal is much smaller as compared with the part excavated for the lacrymal fossa than it is in Man. The entorbital angle or plate of the malar is longer and extends deeper into the orbit than in Man.

In a comparative view of the skulls from above, in which the beginning of the sagittal suture is the centre of the perspective plane, scarcely anything is seen but the smooth expanded vault of the cranium in Man; the narrower temples of the Negro and Australian allow the zygomata to come into view, and in the most prognathic examples the incisors just appear between the prominences of the frontal sinuses.

In the Gorilla the whole length of the face from the lower border of the orbits is seen sloping from beneath the superorbital ridge; the whole span of the large zygomatic arches, with parts of the temporal fossæ, appear at the sides of the narrower temples; the oval cranial vault after a certain expanse changes its curve, and from being convex becomes concave, expanding into a broad base formed by the superorbital ridge in front and by the lambdoidal crest behind, continued into the zygomatic arches at the sides. The small cranial dome also supports the strong sagittal crest which at the coronal suture divides and diverges, curving outwards to the external angles of the superorbital ridge. No quadrumanous animal, and few other mammals, offer a greater contrast with Man in the form and structure of the upper surface of the cranium than the great male Gorilla does.

In the basal comparison of the skulls the basioccipital is longer, thicker vertically, flatter below, and broader in front than in Man; it sends out a short precondyloid process into the jugular foramen on each side; these are overlapped by the synonymous processes of the petrosal anterior to the precondyloid holes: the basioccipital does not anchylose with the basisphenoid; both extend straight forwards, parallel to the plane of the palate, instead of curving from below upwards and forwards as in Man. The *fissura lacera media*, which divides the basioccipital from the petrosal, is longer and narrower, and does not expand at its fore part: the posterior border of the basioccipital becomes less expanded where it joins the condyles. The occipital condyles are much smaller compared with the size of the skull than in Man; they are also less convex and more rounded at their extremities; they are wider apart, and their axes diverge at a more open angle from before backwards. The posterior condyloid fossa extends forwards along the outer side of the condyle to the jugular process; in Man it usually terminates in a postcondyloid foramen, and is filled up by the rough paroccipital ridge which sometimes developes a small (paroccipital) process; this is represented

by a feeble tuberosity below the jugular process in the Gorilla, in which there are no post-condyloid holes. The sutures between the exoccipitals and mastoids remain, but the rest of the lambdoidal suture is obliterated in the Gorilla: the extent of the exoccipitals outside the condyles is less than in Man. The superoccipital is a much broader plate than in Man, and is flat or slightly concave externally, with all trace of the superior angle lost in the anchylosis consequent on the development of the great lambdoidal ridge: it shows nothing answering to the crucial ridge or spine of the human convex occiput. The basisphenoid, besides its non-confluence with the basioccipital, has a larger extent uncovered by the vomer and by the bases of the anchylosed alisphenoids and pterygoids: it is excavated by large sinuses extending into both the alisphenoids and pterygoids: the sinuses are confined to the basisphenoid and presphenoid in Man. The broader pterygoids in the Gorilla anchylose with, and as it were, embrace a greater part of the base of the alisphenoid: the foramen ovale is more remote from the foramen caroticum, and is pushed by the broad ectopterygoid further back from the pterygomaxillary fissure; the extent of the basis cranii between the carotid foramen and sphenomaxillary fissure being twice that in Man. The styliform process is less developed, and the inner border of the glenoid cavity of the squamosal abuts against its whole length, or even extends below or beyond it. Outside the pterygoid the alisphenoid becomes narrower, and is continued more directly upwards into the temporal fossa than in Man: the ectopterygoid ridge is less developed, and the fossa on the outer side of the ectopterygoid is not present, or is very feebly developed. The alisphenoid contracts instead of expanding as it rises, terminates before it gains half the height of the orbit, and is excluded from junction with the parietal by the meeting of the squamosal with the frontal: the expanded spine of the parietal vertebra is thus entirely separated from its neurapophyses in the Gorilla. In the Australian the alisphenoid ascends higher than the malar, but not so far as in the European. Besides the relatively smaller size of the parietal bones, the early obliteration of the sagittal suture, and the development of the crista upon it in the Gorilla, the lower border of the parietal is straighter than in Man and more equally divided between the squamosal and the mastoid. The orbitosphenoids coalesce nearer their origin with the orbital plates of the alisphenoid, obliterating the fissure which in Man is continued outwards from the 'foramen lacerum anterius'; so that this foramen is better defined and has a subquadrate form in the Gorilla; and there are no ridges, called 'lesser alæ,' defining the fossa of the anterior lobe from that of the middle lobe as in Man. The suture between the orbitosphenoids and the frontals is quite obliterated in the Gorilla. A short triangular plate divides the optic hole from the foramen lacerum anterius on each side, which plates answer to rudiments of the 'alæ minores' and to the bases of the anterior clinoid processes, but those processes are not extended backwards as in Man. The foramen rotundum is closer to the foramen lacerum anterius than in Man, and the styliform foramen is closer to the foramen ovale.

The mastoid bone is relatively larger, but developes a smaller and more hemispheric mastoid process. Traces of the suture between the mastoid and squamosal continue longer in the Gorilla than in Man. The upper part of the mastoid extends outwards into a strong angular ridge, and its under part extends from the process inwards as a horizontal plate to join the exoccipital, which plate is of greater extent than in Man, and is not grooved by the digastric muscle; thus the space between the occipital foramen and the external auditory foramen is

considerably greater in the Gorilla than in Man. The stylomastoid foramen is exterior to the stylohyal fossa, not directly behind it as in Man, in whom the stylohyal bone becomes anchylosed at maturity with that fossa and forms the so-called 'styloid process of the temporal.' This process is wanting in the Gorilla, and there is but a rudiment of the vaginal process.

The tympanic, which anchyloses with the mastoid, squamosal and petrosal as in Man, is of greater length than in Man: it forms no part of the glenoid fossa, which is divided from it by the postglenoid process, and the rudiment of the 'fissura Glaseri' is quite behind the glenoid fossa in the Gorilla, whilst in Man, from the different relative position and shape of the tympanic or auditory process, the 'fissura Glaseri' is described as dividing the glenoid fossa transversely. The inner termination of the meatus auditorius is very obliquely cut off, but in a different direction from that in Man: in him it is from behind inwards and forwards, the anterior wall of the meatus being longer than the posterior one: in the Gorilla the inner end of the meatus is cut off obliquely from above inwards, downwards and forwards: at the beginning of the meatus its vertical diameter is greatest, but as it penetrates the cranium the transverse diameter becomes greater, the depth decreasing, and it rather suddenly expands at its inner very oblique termination. The superior size of the mastoid processes in Man relates to the greater amount of muscular action required for the support and movements of the skull, which is balanced upon the erect vertebræ of the trunk: in the Quadrumana, where the skull is thrown more forwards, its support is derived more from the action of the great nuchal muscles inserted into the occiput than from that of the sternomastoids; but we may infer, from the nearer approach which the *Troglodytes Gorilla* makes to Man, in comparison with the *Troglodytes niger*, or with the known species of Orang (*Pithecus*), in regard to its mastoid processes, that it assumed more nearly and more frequently the upright attitude than the inferior anthropoid Apes do.

The air-cells from the tympanum, which are confined to the mastoid in Man, extend in the Gorilla into the squamosal, inflating it above the base of the zygomatic process, and as far forwards as its junction with the frontal, where the squamosal sinuses are contiguous to, though they seem not to communicate with, those of the alisphenoid.

The petrosal is larger in the Gorilla than in Man; its antero-posterior diameter especially is greater: its eustachian process is much more developed and more distinct from the proper apex of the petrosal, which is less jagged than in Man, and rests more completely upon the base of the alisphenoid, almost filling up the vacuity called in Man 'foramen lacerum medius.' The carotid foramen is smaller than in Man: the prejugular process from the inner side of the foramen caroticum abuts upon a corresponding process of the basioccipital, and with it forms the anterior boundary of the foramen jugulare.

The chief characteristics of the frontal, due to its smaller size and the superorbital ridge, have already been noticed: besides these deviations from the Human type, the ectorbital processes stand further out before they bend down to join the malar, and the postorbital angles descend much lower into the temporal fossa and form a longer wedge between the alisphenoid and malar bones, the point terminating on a level with the floor of the orbit. The vomer is deeper and more oblique than in Man, and does not reach so far forwards. The coalesced prefrontals (*laminæ mediæ æthmoidei*) are connate, as in Man, with the olfactory capsules forming the ethmoidal cells, the superior turbinals, the 'partes planæ' and the cribriform

plate, but they do not extend backwards to form a 'crista galli.' The cribriform plate is much smaller, and is sunk into a deep (rhinencephalic) fossa. The palatines form a smaller proportion of the bony palate; their mesial anterior ends advance forwards in a point between the maxillaries, but the mesial posterior ends, which project backwards in a point in Man, are truncate, and the border of the bony palate there presents either a shallow median emargination between two slighter ones, or the whole posterior border (in the younger male) is slightly undulated with a general curve concave backwards; whilst in every variety of the human race the same border presents two lateral concave emarginations divided by the median point. The posterior palatine foramina are close to the palato-maxillary suture: in Man they are nearer the posterior border of the palate. The pterygoid and orbital relations of the palatal bones resemble those of Man.

The maxillary bone, besides its greater relative size, has a relatively longer and shallower palatal portion without any median convexity: it is more expanded anteriorly, instead of being contracted between the premolars: its malar process is considerably deeper, and is perforated by the maxillary or suborbital nerve at a greater distance below the orbit: the single foramen for this nerve is the rarer variety than the double one in the Gorilla: the most decisive distinction from the Human type furnished by the maxillary bone in the present comparison is its exclusion from the nostril by the elongation of the premaxillary and the interposition of the upper angle of that bone between the maxillary and the nasal in the Gorilla. The double fangs of the premolars render the alveolar border or 'process' of the Gorilla's maxillary bone more complex than it is in Man; and it is tumid, and produced anteriorly by the sockets for the enormous canines. The premaxillaries differ from those of Man by their vastly greater proportional size, their greater prominence, the longer persistence of their sutures with the maxillaries and their nasal processes. The extent of their palatal part removes the prepalatal foramina further back from the alveoli, and these foramina are double, or not so completely blended into a single hole below, as in Man. Their median suture with each other, instead of being supported on a prominent ridge at the anterior surface of the bone, as in Man, is sunk into a smooth fossa, and the nasal ridges for the support of the septum narium commence quite within the nostril behind an arched transverse eminence or bar.

The malar bone, besides its superior relative size, has a more convex exterior surface, which is turned more towards the front of the face than in Man: the line of the malomaxillary suture descends more directly downwards and outwards; in Man it extends more outwards before it descends, the suborbital angle of the malar being longer, more slender and pointed than in the Gorilla; the orbital margin is sharp in Caucasians, but is rounded off in Australians. The posterior border of the ectorbital or frontal process of the malar is straight at its commencement, not convex as in Man: the entorbital plate of the malar extends further backwards, and unites in a smaller proportion with the alisphenoid than with the frontal; it is imperforate. The zygomatic suture is a regular or slightly wavy oblique line, not made angular or curved by a sudden notch in the upper part of the zygomatic process of the malar, as in Man.

The zygomatic portion of the squamosal equals in depth the malar portion of the arch, and is not shallower, as in Man: the postglenoid process is stronger and projects down more freely, and relatively lower as respects the tympanic. The squamous plate is lower and more

angular in the Gorilla; its upper border, which does not rise higher than opposite the middle of the orbit, being almost straight; the continuation of the line of this border by the mastoid makes the squamosal appear much longer from before backwards than this temporal element really is. In Man the mastoidal element developes no continuation of the squamous plate, but the hind border of this plate curves down to the place of the primitive suture between the squamosal and mastoid. The whole of the squamosal receives air-cells from the mastoid in the Gorilla, and its exterior surface is made convex and, as it were, swollen out by them: no part of the squamosal is so modified in Man.

At the first view of the skull of the great Gorilla, one is struck by its superior size to the human skull, especially its greater length, and the greater breadth of the face and of the occiput: the brain-case is made to appear more contracted in proportion than it actually is, by the superaddition of the enormous intermuscular crests and superorbital ridge: it would seem, indeed, as if the osseous matter required to form the expanded cerebral chamber in the human skull had been here expended in the formation of the great external productions. Notwithstanding, however, this superiority of size in certain dimensions, and the apparently massive character of the skull of the Gorilla, it is actually lighter than that of Man. The cranium of the adult male *Troglodytes Gorilla,* here described, weighed 1 lb. 7 oz. 8 drs. avoirdupois, whilst the cranium of a male Australian, without the lower jaw, weighed 1 lb. 8 oz. 10 drs. This unexpected result is due to the greater size and extent of the air-cells in the *Troglodytes Gorilla.* The air introduced from the tympanic chamber into the mastoid extends backwards into cells, continued along the base of the lambdoidal crista to its junction with the parietal crista, and from the mastoid forwards, inflating the whole squamosal plate as far as the alisphenoid, which, with the pterygoids, receives air from the sphenoidal sinuses.

The frontal sinuses are divided from each other by a strong median vertical septum, and extend far outwards along the base of the superorbital crest, but do not rise into the cranial plate of the frontal: they open below into the middle meatus, as in Man. The great maxillary sinus or antrum is chiefly remarkable for its extension upwards, where it swells out the maxillary contribution to the inner wall of the orbit; the nasal aperture of the antrum, of a rounded form and two-thirds of an inch in diameter, is covered by the overhanging inferior turbinal bone: the lacrymal canal terminates at the upper part of the orifice of the antrum, not in advance of it, as in Man.

The osseous parts of the olfactory capsule, which have coalesced with the prefrontals and form the 'superior' and 'middle' turbinal processes of the æthmoid, are present, as well as the large independent inferior turbinals: these are all longer in proportion than in Man.

The chief differences which the cranium and teeth of the *Troglodytes Gorilla* present as compared with those parts of the Human structure may be summed up as follows:—

1. The smaller proportional size of the cranium.
2. The more backward position of the foramen magnum, and its more oblique plane in relation to that of the base of the skull.
3. The smaller relative size and more backward position of the occipital condyles.
4. The longer basioccipital, and broader, flatter and lower superoccipital.
5. The longer basisphenoid and shorter alisphenoids.

6. The smaller size of the coalesced parietals, and their separation from the alisphenoids.

7. The conversion of a greater part of the outer surface of the parietals into concavities or depressions for the lodgement of the temporal muscles by reason of the bony crest developed from the line of the obliterated sagittal suture and of the lambdoidal crest.

8. The larger proportion of this crest and of the squamosal plate developed from the mastoid and the smaller size oi the proper mastoid process.

9. The smaller size of the vaginal and styliform processes, and the absence of the styloid process, arising from the non-anchylosis of the stylohyal bone.

10. The larger postglenoid process and the longer auditory process (tympanic bone), with their relative position, one behind, but not below the other.

11. The position of the stronger zygomata opposite the middle third of the basis cranii.

12. The prominent superorbital ridge.

13. The longer nasal bones, anchylosed together and flattened at their lower half.

14. The greater proportional size and greater prominence of the upper and lower jaws.

15. The longer osseous palate, and the median emargination of its posterior border.

16. The parallelism of the alveoli of the molars and canine of one side with those of the other.

17. The diastema or vacant place in front of the socket of the canine in the upper jaw, and behind that socket in the lower jaw.

18. The larger and more produced premaxillaries; the persistence of more or less of their sutures showing the intervention of their upper extremities between the nasal and maxillary bones.

19. The minor extent of connection of the lacrymal with the 'pars plana' of the æthmoid, or their separation by the junction of the orbital plate of the maxillary with that of the frontal behind the lacrymal.

20. The greater depth of the rhinencephalic fossa, and the absence or rudimental state of the 'crista galli.'

21. The squamosal, lambdoidal, alisphenoidal and pterygoid air-cells.

22. The more prominent cusps of the molar teeth.

23. The larger relative size and more complex grinding surface of the last molar tooth in both jaws.

24. The larger relative size of the premolars, especially of the first.

25. The more complex implantation of the premolars by three roots, two external and one internal.

26. The much larger and longer canines.

27. The sexual distinction in the development of these teeth.

28. The more sloping position of the crowns of the incisors.

29. The broader and higher ascending ramus of the lower jaw.

30. The total absence of the prominence of the symphysis forming the chin.

Vertebral Column.—Of the vertebræ of the trunk all are present in this skeleton except the seventh cervical (which has been modelled in plaster) and the caudal vertebræ.

The number of dorsal vertebræ, or those bearing moveable ribs, is 13; that of the lumbar vertebræ 4; that of the sacral vertebræ 5; the total number of true vertebræ being the same

as in Man, only the ribs which answer to the transverse processes of the first lumbar in Man retain their distinctness with a greater length.

Cervical Vertebræ.—Of the true vertebræ the cervical series departs most from the Human type in the extraordinary length of the spines of the last five vertebræ; that of the fourth cervical being not less than three inches and a half; those of the third and fifth are nearly of the same length, but are thicker, and have a slight curvature in opposite directions, away from the fourth, the third forwards and the fourth backwards, in a very slight degree; the spines of the sixth and seventh cervicals gradually decrease in length and increase in thickness: the spine of the dentata is trihedral, the surfaces being divided by produced sharp ridges: the canal for the vertebral artery decreases in diameter from the sixth forward to the atlas. The bodies of these vertebræ are longer in proportion to their breadth than in Man, and the lower (pleurapophysial) part of the transverse process of the sixth is more suddenly increased in length and breadth, and diverges more from the upper division of the same process. The atlas is narrower than in Man, with a wider neural canal, especially between the condyles, which are smaller than in Man. An obtuse process is developed backwards from the part representing the body, which is broader than in Man; the perforation of the transverse process is smaller, and that process is narrower, especially vertically; the groove behind the upper articular processes is deeper and narrower. The axis or dentata differs chiefly in the greater size of the neural canal, and in the greater length and less breadth of the neural spine; the zygapophyses are smaller, the transverse processes are more directly perforated by the arterial foramina, and the diapophyses are more produced, and more remote from the posterior zygapophyses.

The bodies of the succeeding cervical vertebræ are longer in proportion to their breadth; the basis of the neurapophysis ascends to embrace the hinder half of the antecedent vertebra as in Man. The difference observable in the dentata is manifested in excess in the third cervical vertebra, the spinous process of which more than doubles the vertical diameter of the rest of the vertebra; the neural canal also exceeds that of Man in the same diameter; the zygapophyses are smaller than in Man: the arterial canal is transversely elliptic, not circular; the transverse process is longer, more slender and more simple; the pleurapophysial not projecting distinctly from the diapophysial part; the diapophysis is more remote from the zygapophysis; the neurapophyses are much thicker and stronger; the long neural spine becomes subcompressed and slightly dilated at its extremity, which is not bifurcate. The same general differences, and especially the very striking one in the length of the neural spine, are manifested in the fourth cervical vertebra, but the pleurapophysial part of the transverse process is now distinctly developed as a triangular depressed plate produced forwards and a little downwards; the lower part of the centrum is proportionally less than in Man, and the smaller size of the zygapophysis is the more remarkable in contrast with the larger proportions of almost all the rest of the vertebræ. In the fifth cervical vertebra the zygapophyses equal in size those of the corresponding vertebra in Man; the pleurapophysial part of the transverse process is less developed than it is in the fourth: the arterial canal is wider, the anterior and posterior zygapophyses are more nearly upon the same plane, and the neural arch has a greater antero-posterior extent; the superior thickness of the neurapophysis above these processes is very striking: the arterial canal of the transverse process

increases in a greater degree in the Gorilla; the pleurapophysial part of that process diverges more from the diapophysis, is broader and more produced than in Man; the zygapophyses are larger, but the centrum is still narrower; the neural spine is still very long and very strong, but is somewhat shorter than in the antecedent vertebra.

The dorsal vertebræ, besides their increase of number—the thirteenth however answering to the first lumbar in Man, with the pleurapophyses retained as distinct elements—differ in the greater length of the spines of the first five vertebræ, which progressively decrease to the length they present in the Human subject, but with greater thickness, and in the last three with greater antero-posterior extent. The bodies of the middle dorsal vertebræ are shorter in proportion to their breadth; the diapophyses are thicker, stand more directly outwards, and the costal surfaces are more concave and oblong; the metapophysis which projects distinctly in the eleventh vertebra in Man, does not so appear until the twelfth in the Gorilla. In the first dorsal the centrum is larger vertically, and the spine is twice the length of that in Man; the zygapophyses are larger than in Man; the costal surface is more produced in the side of the body: but the chief difference is in the position and direction of the diapophysis, which in the Gorilla projects directly outwards below the level of the anterior zygapophysis; the fore part of the base of the neurapophysis is less deeply grooved in the Gorilla. In the second vertebra of the back the spine is still much longer and stronger; the diapophysis is thicker, shorter, and more directly extended outwards; the anterior zygapophyses are more produced; the neural canal is rather narrower. The same general differences may be noticed in the three succeeding dorsal vertebræ, except that the spine becomes shorter and the centrum larger in the Gorilla; the neural arch rises more abruptly beyond the anterior zygapophysis. In the sixth dorsal vertebra the neural spine is reduced to the same length as in the corresponding spine in Man; the centrum is larger, the neural canal of the same size, the posterior costal pits are longer, the diapophyses still stand out more transversely. In the Gorilla the proportionate increase of the centrum is greater than in Man; the neural spine is less obliquely bent backwards, and is thicker antero-posteriorly, though not longer; the anterior zygapophyses are more produced; the diapophyses are broader and somewhat shorter. In the eleventh dorsal vertebra of the Gorilla the neural spine is much expanded at its extremity. In the twelfth, there are distinct and well-developed metapophyses, projecting from the fore part of the diapophyses, and overhanging the anterior zygapophyses: this vertebra corresponds in this character with the eleventh of the Human subject. The neural spine is broader and thicker, especially superiorly; there is but one costal surface on each side; the diapophyses are reduced in size, the metapophyses equalling them, the body and neural spine increasing.

The thoracic ribs are longer and thicker, more convex on their inner side, with the subcostal groove not defined, except in two or three of the longest ribs near their vertebral end; the neck is shorter and thicker than in Man; the longest rib is one foot four inches in length,—that of the longest rib in an average-sized man being thirteen inches. The first rib in the Gorilla is broader in proportion to its length; the neck especially is shorter and broader, and the body of the rib is less curved than in Man.

The manubrium sterni is much broader than in Man, and less deeply excavated for the clavicles; the synchondrosal surface for the succeeding sternal bone is broader, but much less thick than in Man.

In the first lumbar vertebra the metapophysis is still large and distinct; the anterior zygapophysis becomes more convex and oblique in position; the diapophysis is suddenly elongated, as compared with that of the corresponding Human vertebra; the chief difference is seen in the smaller size of the neural canal which relates to the inferior development of the lower extremities, and in the greater length and terminal expanse of the neural spine. The same difference obtains in the second lumbar vertebra; the diapophyses are broader and more depressed in the Gorilla; the anterior zygapophyses are more convex in part, not wholly concave as in Man; a fossa divides them from the metapophyses; the centrum is as broad as in Man, but is deeper and longer; the neural spine extends more obliquely backwards, and its expanded apex is bifid. In the last lumbar vertebra the difference is very striking in the minor expanse of the centrum in the Gorilla, especially behind, in the much smaller and more depressed form of the neural canal, in the shorter and broader diapophysis, the more distinct metapophysis, in the convex anterior and more approximated posterior zygapophysis, and in the greater length of the centrum.

The lumbar vertebræ have longer bodies in proportion to their breadth, their spines slope more backwards; the metapophyses continue more distinct and prominent; the spines are more expanded at their extremity, and in all but the last are sub-bifid, in the Gorilla.

When naturally articulated together they form a straight line, without any tendency to convexity forwards as in Man; and the whole series of true vertebræ in the Gorilla form but one curvature, which is slightly concave forwards, especially in the dorsal region.

The sacrum departs in a greater and more instructive degree from the Human type; it consists of five anchylosed vertebræ, but they are longer and narrower than in Man, and present a very slight curve, with the concavity forwards; the neural foramina are much smaller, the neural spines much more developed, and coalesce to form a single strong bony ridge, extended over and gradually subsiding on the last sacral vertebra, the neural arch of which is entire; the articular surface of the first sacral vertebra is one-third smaller than in Man; the zygapophyses are smaller, but the metapophyses are present and well developed; the iliac surface extends to the upper half of the third vertebra, is narrower than in Man, but owing to the greater length of the first and second vertebræ, it is longer. The posterior outlets of the nervous canals are very small, and the whole neural canal is much more contracted.

The scapula, besides its greatly superior size, being eleven inches and a half in length, differs from that of Man, 1st, in the more oblique course of the spine, which leaves a greater extent of the superior costa; 2nd, in the greater length and breadth of the coracoid; 3rd, in the straightness of the inferior costa; and 4th, the greater convexity of the base, especially as it approaches the lower angle: the plane of the glenoid cavity is less parallel with the base than in Man, it looks more obliquely upwards; the suprascapular notch is not defined. The glenoid cavity resembles that of Man in shape, but relatively to the entire bone is somewhat smaller; it is somewhat more concave.

The clavicle is of the same length as that in Man, but is thicker, with a subtrihedral shaft and the sigmoid flexure less marked; the sternal articular surface is less oblong; the surface for the attachment of the subclavius muscle near that end is less defined; in the Gorilla, the acromial end is broader and flatter below, the tuberosities at the commencement of the same

flattened end of the Human clavicle for the attachment of ligaments are less marked in the Gorilla.

The humerus is one foot five inches and a half in length, and has a proportionally thicker shaft than in Man; the tuberosities and bicipital groove are more strongly developed at the proximal end; there is a rough surface for the attachment of the pectoral muscle, but it is not developed into a ridge as in Man; the rough surface for the deltoid is well-marked; the supinator ridge is more strongly developed and rougher than in Man, and terminates by a strongly-marked angle or tuberosity at the outer condyle. The medullary artery enters the inner side nearer its middle than in Man. The inner condyle is more strongly developed, and the ridge leading to it is more marked than in Man. The olecranal cavity is relatively larger, deeper, and better defined; its contour is triangular. The distal end of the humerus is bent more forwards in the Gorilla. The trochlear concavity of the ulnar division of the articular surface is less deep than in Man, and that surface is continued farther upon the inner side of the prominence in the left; there is an intercondyloid vacuity above the ulnar division of the articular surface.

The ulna is one foot two inches in length without its distal epiphysis, and its shaft is relatively thicker than in Man; it is more bent with the concavity forwards; the outer border of the greater sigmoid cavity is more produced in the Gorilla, and is entire; the lower border is less produced; there is a deeper concavity on the inner side of the head of the bone; the rough surface for the insertion of the *brachialis anticus* is relatively longer and better defined, especially by the ridge on its outer side: the interosseous ridge is not developed from the shaft in the Gorilla; in its place there is a broad rough depression, and the fore part of the shaft is more convex and smoother than in Man; the medullary artery enters the fore part of the shaft below the proximal third, and the canal extends proximad.

The radius is one foot one inch in length without the distal epiphysis, and its shaft is relatively thicker than in Man; the contour of the proximal end is a full ellipse, not circular as in Man; the shaft is more bent outwards than in Man, which with the greater opposite bend of the ulna leaves a wide interosseous space between the bones; the ridge for the interosseous ligament is developed from the ulnar side of the shaft, beginning as low as the lower fourth of the bone; the ridge dividing the depression or the extensor tendons of the digits from the extensor tertii intermedii and the groove for that tendon is less developed in the Gorilla, in accordance with the minor development of the thumb of that hand.

The carpus consists of eight bones as in Man, the scaphoïdes not being divided as in the Orang. The scaphoïdes is one-third larger than that of Man, being one inch seven lines in length, and differs in the production of a strong tuberous process beyond the surface for the radius; this surface is more elongate than in Man: the trapezial surface is more convex: the surface for the magnum less concave and smaller in proportion to the convex crescentic surface continued from it to the trapezial surface. In the proportionate extent of the tuberous process, the Gorilla surpasses the Chimpanzee. The os lunare having the same superior proportion in size to that of Man, more closely resembles it in shape. The pisiforme is more than three times the size of that in Man, is much longer in proportion to its breadth; its articular surface is undulating, not flat: the trapezium, although one-third larger than in Man, has a smaller articular surface for the pollex, which is more convex. The tuberosity external

to this surface is more produced, as is also that between the surface for the scaphoid and that for the thumb. The os magnum has the surface for the middle metacarpal much more produced in the antero-posterior direction, and the undulations are more marked. The surface has a small notch on each side the middle part. The unciform process of the os unciforme is much thicker and more produced, and the articular surface is continued upon it, which makes it more concave. The articular surfaces do not entirely surround the rough flattened base of the bone as in Man, but are interrupted by a rough tract continued from that base to the unciform process.

The metacarpal of the thumb is a little longer than in Man, but not quite so broad: the proximal trochlea is more concave vertically and more convex transversely, and the distal surface is more convex. The proximal phalanx is one-fifth longer, and is more slender than in Man.

The metacarpals of the other fingers are more than one-third larger and longer than in Man, their shaft is more bent; the tuberosities beneath the proximal articular surfaces are better developed: the articular surface on the outer side of the base of the second metacarpal is divided by a rough groove which only indents it in Man: the distal convexities are relatively larger. The proximal phalanges of these fingers differ not only in their greatly superior size, but in the deep excavation of their under or anterior surface, which is bounded by rough lateral ridges; they are also more flattened and rather more bent. The distal phalanges of the anterior extremity are longer, more slender, and less expanded at their rough terminations.

Each os innominatum is one foot three inches in length, that of Man being seven inches and a half: the breadth of the ilium is eight inches and a half, that of Man being six inches. The ilium is less concave, of a more triangular figure, the anterior border being much longer and straighter. The superior labrum of the ilium describes a more regular convex curve, and does not present any partial thickening near its middle as in Man. The more elongated and narrower form of the sacral surface corresponds with what has been noticed in the sacrum: the posterior angle or spine of the ilium is above that surface, not behind it as in Man: the distance between the antero-superior and antero-inferior spine is much greater in the Gorilla: the antero-inferior spine is situated, as in Man, just above the acetabulum. The upper ischiatic notch is much less deep than in Man, and there is a very feeble rudiment of the tuberosity dividing it from the lower notch. The acetabulum resembles in form and is not much larger than that of Man: the obturator foramen presents a more regular oval form than in Man, and its long axis inclines from above downwards and inwards instead of downwards and backwards as in Man: the upper border is not impressed by the oblique groove for the obturator nerve and vessels as in Man. With regard to the ischium, its most characteristic distinction in the Gorilla is seen in its great extent below the acetabulum where it forms a strong subtrihedral column, terminating below in the rough flattened tuberosity, the aspect of which is wholly downwards, not backwards as in Man: the united plates of the ischium and pubes, bounding the obturator foramen internally, are considerably broader than in Man. The plane of the ilium is twisted almost at right angles with that of the ischium and pubes in the Gorilla.

The femur is shorter than in Man, and much shorter in proportion to the breadth of the

shaft; its length is one foot three inches; the head is more relieved from the neck, and shows a less deep depression for the ligamentum teres; the neck is less oblique than in Man; the great trochanter rises to a level with the upper border of the head; the small trochanter is less prominent, but has a larger base than in Man, and is more remote from the great trochanter; the digital fossa at the root of the great trochanter is less deep in the Gorilla. The linea aspera is less developed, and the back part of the lower half of the shaft is flat and smooth: the inner angle of the popliteal space presents a well-marked rough depression, which is not present in the Human femur, and the shaft more gradually expands to the condyles. The outer articular condyle is narrower than the inner one, the reverse being the case in Man: the inner condyle is not longer than the outer one, as in Man. The rotular surface is shallower, the lateral borders are better defined: the medullary artery enters the middle of the back part of the shaft, and the course of the canal is proximad or upward.

The length of the tibia is one foot six lines, and its shaft is as thick as in Man, and expands more gradually to the distal end: the conformation of the proximal surface is similar to that in Man; the spine is rather stronger, and an anterior spine or tuberosity is more distinctly developed. The internal tuberosity in front of the fibular one is better defined; the interosseous ridge is very feebly marked in the Gorilla, and the anterior ridge of the shaft is much less marked than in Man. The astragalar surface is more undulating, less concave, and more directly continued upon the internal malleolus: the side of the distal end next the fibula instead of being concave forms an angular projection. There are two orifices for medullary arteries, one in the usual position directed downwards, the second at the junction of the middle and lower thirds, sloping upwards: the upper surface for the fibula is convex. The corresponding part of the fibula presents an articular concavity: this bone is stronger in proportion to its length than in Man; the lower articular surface of the fibula is flatter and divided into two facets more distinctly than in Man.

The tarsus consists of seven bones, as in Man and the Quadrumana. The astragalus of the Gorilla equals in size that of Man, but is broader in proportion to its length: the surface for the tibia is less defined, especially from the inner facet, which in the Gorilla is almost horizontal and appears as a concave inner termination of the upper surface. The anterior surface is more convex, especially vertically, and more directly continued into the anterior calcaneal surface. The inner tuberosity is larger and more advanced: the Gorilla differs from the Chimpanzee in the greater size of this process, and in the greater proportional size of the scaphoid convexity, in which respect its astragalus more resembles that of Man. The calcaneum of the Gorilla is a longer and more slender bone than in Man, which is chiefly due to the greater length and slenderness of the posterior or calcaneal process. The lower surface of the bone is smoother, narrower and more concave longitudinally; the groove for the flexor tendons beneath the inner astragalar surface is wider and better defined: that astragalar surface is broader in proportion to its length, and there is a deep longitudinal groove on the outer side below the outer astragalar surface, which does not exist in Man. The anterior cuboidal surface is placed further from the outer side of the bone than in Man; the outer side forming a rough convex protuberance at its anterior half. The calcaneal process is proportionally longer than in the Chimpanzee, and in that respect comes nearer the form of the bone in Man. The naviculare is one-third larger than in Man, the increase being in its trans-

verse extent, and due to the greater development of the rough convex protuberance at the inner end of the bone: the astragalar concavity is longer transversely than in Man, less oval, and more elliptic in figure, and with the border more sharply defined; the surface for the cuneiform bones is nearly like that in Man in size and shape, but it is continuous at the inner end of the bone with the astragalar surface. In the Chimpanzee the astragalar surface of the naviculare more resembles the shape of that in Man. The entocuneiform has an equal vertical, but a minor longitudinal, extent than in Man, and chiefly differs in the convexity of the articulation for the hallux, which articular surface in Man is nearly flat: this difference is very significative of the different function of the hallux in the two species; the chief fulcrum of the foot requiring a firm articulation in Man; but in the Gorilla, great extent of motion for the functions of an opposable grasping thumb. The astragalar surface is divided from that for the mesocuneiform. This bone is smaller than in Man, and relatively to the entocuneiform much smaller; the articular surface on the inner side of the bone is interrupted or divided by a narrow groove. The ectocuneiform is broader than in Man, and its lower part developes a more distinct protuberance: it has two articular surfaces at the upper part of its outer surface. The cuboid is smaller than in Man, especially in its antero-posterior extent; the calcaneal surface is more quadrate and flatter, and approaches externally much closer to the surface for the fifth toe: the whole of the upper half of the inner side is occupied by the two articular surfaces for the ectocuneiform bone, whereas there is only one articular surface at the middle of the inner surface of the cuboid in Man: the surfaces for the two outer digits are larger in the Gorilla: the groove crossing the fore part of the under surface of the bone is deeper and better defined.

The metatarsal of the hallux is fully as large as that in Man; it differs in the deeper concavity of the proximal articular surface, and in the more prominent convexity of the distal one. The proximal phalanx of the hallux also equals that of Man in size; the borders of its proximal concavity are less neatly defined. The ungual phalanx is somewhat less than that of Man, especially in its terminal rough tuberosity; it is concave below instead of being convex. The remaining metatarsals of the foot are much longer and stronger than in Man; the upper border is more bent. The second metatarsal has an articular facet on the inner side of its base, as well as one on the outside continuous with the facet for the mesocuneiform bone. The distal articulation forms a more protuberant convexity. In the fourth metatarsal the articular surface on the inner side of the base is continuous with the cuboidal surface. The first and second phalanges are larger and more bent. The ungual phalanges are longer and narrower in proportion than in Man.

In considering the import and value of the osteological differences between the Gorilla —the most anthropoid of all known brutes—and Man, especially in reference to the hypothesis of the origination of species of animals by gradual transmutation of specific characters, it has been urged and must be admitted that the skeleton may be modified to a certain extent by the action of the muscles to which it is subservient, and that, in domesticated races, the size of the animal may be brought to deviate, in both directions, from the specific standard.

By the development of the processes, ridges and crests, and also by the general proportions of the bones themselves, especially those of the limbs, the Human anatomist judges

of the muscular power of the individual to whom a skeleton under comparison has appertained.

The influence of muscular actions in the growth of bone is more strikingly displayed in the change of form which the cranium of the young carnivore or the sternum of the young bird undergoes in the progress to maturity; not more so, however, than is manifested in the progress of the development of the cranium of the Gorilla itself, which results in a change of character so great as almost to be called a metamorphosis.

In some of the races of the domestic dog, the tendency to the development of parietal and occipital cristæ is lost, and the cranial dome continues smooth and round from one generation of the smaller spaniel, or dwarf pug, *e.g.* to another; whilst in the large deer-hound those bony cristæ are as strongly developed as in the wolf. Such modifications however are unaccompanied by any change in the connections, that is, in the disposition of the sutures of the cranial bones; they are due chiefly to arrests of development,—to retention of more or less of the characters of immaturity: even the large proportional size of the brain in the smaller varieties of house-dog is in a great degree due to the rapid acquisition by the cerebral organ of its specific size, agreeably with the general law of its development, but which is attended in the varieties cited by an arrest of the general growth of the body, as well as of the particular developments of the skull in relation to the muscles of the jaws.

No species of animal has been subject to such decisive experiments, continued through so many generations, as to the influence of different degrees of exercise of the muscular system, difference in regard to food, association with Man, and the concomitant stimulus to the development of intelligence, as the dog. And no domestic animal manifests so great a range of variety in regard to general size, to the colour and character of the hair, and to the form of the head as it is affected by different proportions of the cranium and face, and by the intermuscular crests superadded to the cranial parietes. Yet under the extremest mask of variety so superinduced, the naturalist detects in the dental formula and in the construction of the cranium the unmistakeable generic and specific characters of the *Canis familiaris*. This and every other analogy applicable to the present question justifies the conclusion that the range of variety allotted to the Gorilla, Chimpanzee and Orang-utan under the operation of external circumstances favourable to their higher development would be restricted to differences of size, of colour and other characters of the hair, and of the shape of the head in so far as this is influenced by the arrest of general growth after the acquisition by the brain of its mature proportions, and by the development, or otherwise, of processes, crests and ridges for the attachment of muscles. The most striking deviations from the form of the human cranium which that part presents in the great Orangs and Chimpanzees result from the latter acknowledged modifiable characters, and might be similarly produced; but not every deviation from the cranial structure of Man, nor any of the important ones upon which the naturalist relies for the determination of the genera *Troglodytes* and *Pithecus*, have such an origin or dependent relation. The Chimpanzees, indeed, differ specifically from both the Orangs and Man in one cranial character, which no difference of diet, habit or muscular exertion can be conceived to affect.

The great prominent superorbital ridge, for example, is not the consequence or concomitant of muscular development; there are no muscles attached to it that could have excited its

growth. It is a characteristic of the cranium of the genus *Troglodytes* from the time of birth to extreme old age: by the prominent superorbital ridge, for example, the skull of the young Chimpanzee with deciduous teeth may be distinguished at a glance from the skull of an Orang at the same immature age; the genus *Pithecus*, Geoffr., being as well recognised by the absence, as the genus *Troglodytes* is by the presence, of this character. The superorbital ridge, which augments the frame of the orbit in the Chimpanzees, and gives a more vertical position to its plane than in the Orangs, and which also supports a thick moveable fold of integument clothed with bushy eyebrows, relates to the greater accuracy and activity of the visual sense, and harmonises with the superior activity and strength of the great African anthropoid apes, as compared with the more slothful species of the Indian Archipelago. We have no grounds, from observation or experiment, to believe the absence or the presence of a prominent superorbital ridge to be a modifiable character, or one to be gained or lost through the operations of external causes, inducing particular habits through successive generations of a species. It may be concluded therefore that such feeble indication of the superorbital ridge, aided by the expansion of the frontal sinuses, as exists in Man, is as much a specific peculiarity of the Human skull, in the present comparison, as the exaggeration or suppression of this ridge is respectively characteristic of the Chimpanzees and Orangs.

The equable length of the Human teeth, the concomitant absence of any diastema or break in the series, and of any sexual difference in the development of particular teeth, are to be viewed by the light of actual knowledge as being primitive and unalterable specific peculiarities of Man.

Teeth, at least the ordinary dentine of mammals, are not organized so as to be influenced in their growth by the action of neighbouring muscles: pressure upon their bony sockets may affect the direction of their growth after they are protruded, but not the specific proportions and forms of the crowns of teeth of limited and determinate growth. The crown of the great canine tooth of the male *Troglodytes Gorilla* began to be calcified when its diet was precisely the same as in the female, when both sexes derived their sustenance from the mother's milk. Its growth proceeded and was almost completed before the sexual development had advanced so as to establish those differences of habits, of force, of muscular exercise, which afterwards characterize the two sexes. The whole crown of the great canine is, in fact, calcified before it cuts the gum or displaces its small deciduous predecessor: the weapon is prepared prior to the development of the forces by which it is to be wielded; it is therefore a structure fore-ordained,—a predetermined character of the Chimpanzee,—by which it is made physically superior to Man, and one can as little conceive its development to be a result of external stimulus, or as being influenced by the muscular actions, as the development of the stomach, the testes or the ovaria.

The two external divergent fangs of the premolar teeth, and the slighter modifications of the crowns of the molars and premolars, appear likewise from the actual results of observation to be equally predetermined and non-modifiable characters.

No known cause of change productive of varieties of mammalian species could operate in altering the size, the shape, or the connections of the premaxillary bones, which so remarkably distinguish the great *Troglodytes Gorilla*, not from Man only, but from all other anthropoid apes. We know as little the conditions which protract the period of the obliteration of the

sutures of the premaxillary bones in the *Tr. Gorilla* beyond the period at which they disappear in the *Tr. niger*, as we do those that cause them to disappear in Man earlier than they do even in the smaller species of Chimpanzee.

There is not, in fact, any other character than those founded upon the developments of bone for the attachment of muscles, which is known to be subject to change through the operation of external causes: nine-tenths therefore of the differences, especially those very striking ones manifested by the pelvis and pelvic extremities, which have been cited as distinguishing the great Chimpanzee from the Human species, must stand in contravention of the hypothesis of transmutation and progressive development until the supporters of that hypothesis are enabled to adduce the facts and cases which demonstrate the conditions of the modifications of such characters.

If the consideration of the cranial and dental characters of the *Troglodytes Gorilla* has led legitimately to the conclusion that it is specifically distinct from the *Troglodytes niger*, the hiatus is still greater that divides it from the Human species; between the extremest varieties of which there are no osteological and dental distinctions comparable to those manifested by the longer premaxillaries and larger incisors of the *Troglodytes niger* as compared with the *Tr. Gorilla.*

The analogy which the establishment of the second and more formidable species of Chimpanzee in Africa has brought to light between the representation of the genus *Troglodytes* in that continent and that of the genus *Pithecus* in the great islands of the Indian Archipelago is very close and interesting. As the *Troglodytes Gorilla* parallels the *Pithecus Wurmbii,* so the *Troglodytes niger* parallels the *Pithecus Morio,* and an unexpected illustration has thus been gained of the soundness of the interpretation of the specific distinction of that smaller and more anthropoid Orang.

It is not without interest to observe, that as the generic forms of the *Quadrumana* approach the *Bimanous* Order, they are represented by fewer species. The Gibbons (*Hylobates*) scarcely number more than half-a-dozen species; *Pithecus* has but two species, or at most three; *Troglodytes* is represented by two species.

The importance of the question as to the unity of the Human species solved by the constancy of those osteological and dental characters to which the attention is more particularly directed in the investigation of the corresponding characters in the higher *Quadrumana,* and the interest of the comparison, will justify the minuteness with which those characters have here been detailed.

MAN is the sole species of his Genus, the sole representative of his Order; he has no nearer physical relations with the brute-kind than those which flow from the characters that link together the unguiculate division of the placental subclass of MAMMALIA.

Presented by Captain Harris.*

* This estimable and accomplished Seaman, from whose enlightened endeavours to advance the knowledge of the zoology of Africa most valuable results were expected, perished in a tornado off the west coast of Africa, which swamped the vessel he commanded; the Council of the College, in consideration of the above valuable donation, voted the sum of £50 in aid of a subscription raised by the Merchants and Merchant-service of Bristol for the relief of his Widow and Infant children.

5179. The cranium of an adult male Gorilla (*Troglodytes Gorilla*).

The entire molar series is preserved on the left side; the right anterior premolar, with the incisors and large canine of both sides, have been lost. The nasal portions of the maxillo-premaxillary sutures remain, and show these bones to have been extended to join the nasals, where they slightly expand. The anterior half of the sagittal crest is double or divided by an angular groove. The base of the cranium is broken away, exposing the interior of that cavity, and showing the oblique and sudden expansion of the tympanic end of the meatus auditorius.

Presented by Captain Harris.

5180. A plaster cast of the cranium of an old male *Troglodytes Gorilla.*

The angular groove is continued along the greater proportion of the sagittal crest.

Presented by the Philosophical Institution of Bristol.

5181. A plaster cast of the cranium of an adult, but younger, male *Troglodytes Gorilla.*

The permanent dentition has been fully acquired. The sagittal crest is entire.

Presented by the Philosophical Institution of Bristol.

5182. A plaster cast of the cranium of an adult female *Troglodytes Gorilla.*

It shows the smaller relative size of the canines, as compared with the molars and incisors, in this sex. The temporal ridges extend to the sagittal suture, where they are divided by a narrow groove, and are not developed into a crest.

The originals of the three preceding specimens were obtained from the Gaboon river, and are preserved in the Museum of the Philosophical Institution at Bristol.

Presented by the Philosophical Institution of Bristol.

5183. A cast of the cranium of a variety of the *Troglodytes Gorilla,* from the vicinity of the river Danger, west coast of Africa.

This cranium is larger than the largest of those, above described, from the Gaboon, and differs remarkably in the proportions of some of its parts, not only of those that relate to muscular attachments, but of parts exempt from the modifying influences of such. The bony palate, for example, is longer, narrower and deeper; the basioccipital is longer and narrower; the vaginal process of the tympanic is much more strongly developed, the whole under wall of the auditory canal being, as it were, pinched up and produced downwards, the margin becoming acute as it extends mesiad and terminating in front of the stylohyal fossa; the ento-glenoid process is smaller and shorter, not extending one line below the eustachian process of the petrosal.

When the upper surface of the cranium of the Gorilla from the river Danger is compared

with the same part of that from the Gaboon, we see not only a much greater development of the lambdoidal and sagittal intermuscular crests, but the superorbital ridge is more produced both upwards and forwards from the plane of the forehead. In comparing the skulls of the two varieties in a direct front view, the malar bones are larger, the lacrymal bones smaller, and the lacrymal fossæ and canals much more expanded, than in the Gaboon variety. The nasal aperture is also wider and has more sharply defined lateral borders in that from the river Danger. But the upper jaw below the nostril is not more developed, and in proportion to the rest of the skull is shorter and narrower than in the variety from the Gaboon. The suborbital foramina are two on one side and three on the other in the skull under description, in which, as in the Gaboon variety, there is neither superorbital foramen nor groove. It would at first seem probable that the greater development of the lambdoidal and sagittal cristæ, to which the greater extent of the cranial part of the skull depends, in the specimen from the river Danger, might be due to the greater age of the individual and the longer continuance of the stimulus of the action of the muscles concerned in the support of the head, and in the movements of the anteriorly produced and preponderating jaws. But the condition of the grinding surface of the teeth, and more especially that of the sutures, negative the idea of the skull of the Gorilla from the river Danger having belonged to an older animal than those skulls of the Gorilla from the Gaboon with which it has been compared. In fact, in no other skull of the adult *Troglodytes Gorilla* that has hitherto been described, is the course and extent of so many sutures more clearly traceable than in the present specimen. The whole circumference of the partially coalesced nasal bones is shown by a suture which is as wavy or dentated as most of those in the Human cranium. The two nasal bones are quite blended together at their upper or interorbital halves, which form the usual well-marked ridge-like prominence characteristic of the species. Above this ridge the bone expands and again contracts as it ascends, and terminates in a point within three lines of the summit of the superorbital ridge. The remnant of the straight suture which divided the lower halves of the nasals is confined to the anterior surface of those bones.

The suture of the upper expanded part of the premaxillary, which is wedged between the nasal and maxillary, and forms the upper and lateral boundary of the nostril, is very distinctly marked, and is continued down to within an inch of the alveolar border between the canine and outer incisor: the premaxillary suture on the inner surface of the nostril is continued into the outer one about nine lines below the nasal bone, and so insulates the upper end of the premaxillary. This variety does not exist in the skulls of the Gaboon Gorillas here compared, and may be accidental to the individual from the river Danger.

The squamosal unites with the frontal by a dentated suture more than an inch long, separating the alisphenoid from the parietal to the same extent. The suture between the squamosal and alisphenoid is also dentated; that between the squamosal and parietal is even and is slightly concave upwards instead of being convex as in Man; that between the mastoid and parietal is convex upwards and is continued backwards upon the lambdoidal crista, where it bends down to define the mastoid from the supcroccipital. The coronal suture becomes obliterated at the base of the fronto-parietal crest at the junction of its middle and anterior thirds, thus indicating the proportion of that crest which is formed by the coalesced frontal bones.

The remarkable skull above described and compared belongs to the 'Philosophical Institution of Bristol,' and, through the liberality of the Council of that Institution, the opportunity was granted of pursuing the above comparisons, which could not have been made on the plaster cast alone.

Presented by the Philosophical Institution of Bristol.

Order BIMANA.

Genus *Homo.*

Dental formula:—$i\,\frac{2-2}{2-2},\ c\,\frac{1-1}{1-1},\ p\,\frac{2-2}{2-2},\ m\,\frac{3-3}{3-3}=32.$

The symbols of the teeth are:—*i* 1, *i* 2, *c*, *p* 3, *p* 4, *m* 1, *m* 2, *m* 3; showing that the teeth which, in reference to the typical series, are not developed in Man, are the outermost incisor, *i* 3, and the first and second premolars, *p* 1 & *p* 2, on each side of both jaws. In these characters the dentition of the genus *Homo* agrees with that of the Catarhine *Quadrumana,* but the teeth are of equal length, and the series is uninterrupted.

The vertebral formula is:—7 cervical, 12 dorsal, 5 lumbar, 5 sacral, and 3 caudal.

Melanian (dark-brown or black) variety.

5184. An artificially articulated skeleton, with the mature dentition complete, of a female Australian.

The essential osteological characters of the Human species are fully manifested in this, in some respects, lowest race of the Melanian variety: such, *e. g.*, as the well-known modifications of the pelvis and pelvic extremities for maintaining the erect posture, and the specific distinctions of the skull, as described in the comparison of that of the Gorilla with the skull of the Negro.

The inferior characters of the Melanian as compared with other races of Mankind are illustrated in the present skeleton by the narrowness of the cranium, the prominence of the alveolar parts of the jaws, the flatness of the nose-bones, and the recession of the chin. The squamosal unites with the frontal on both sides of the cranium, as in the Chimpanzee.

The bifurcate spines of the fourth and fifth cervical vertebræ are the shortest, those of the third and sixth are next in length: the spines of the second and seventh are the longest and strongest; the former is notched, the latter expanded and obtuse, at its extremity. The ribs of the twelfth dorsal vertebra are little more than an inch in length. The metapophyses are distinctly developed on the eleventh dorsal, increase in length in the twelfth, and attain the upper part of the anterior zygapophyses in the first and following lumbar vertebræ. The diapophysis, which is distinct but short in the last two dorsals, is suddenly increased in

length in the lumbar vertebræ, in the last of which it is also much increased in breadth, especially on the right side, where it presents a rough surface for articulating with the contiguous parts of the sacrum and the iliac bones. The pelvic cavity exhibits the sexual expansion, but the iliac bones are smaller and narrower than in the European female: they are much thinned and the substance is partly absorbed at the centre, indicating the effects of pressure during pregnancy.

Presented by the Zoological Society of London.

The following, to No. 5284 inclusive, are parts of the skeleton of a male Australian, from the neighbourhood of Port Essington:—

Presented by Captain Blackwood, R.N.

5185. The skull.

A small portion of the alisphenoid joins the parietal on both sides. The right anterior incisor has been removed during life and the alveolus is obliterated. As compared with the Chimpanzees this skull differs most in the great superior capacity of the cranium, and in the shortness of the jaws, especially of the upper one. The outer surface of the nasal bones is arched transversely. The foramen magnum is placed nearer the centre of the base of the skull, the anterior end of the condyles reaching the transverse line which equally bisects the base. The condyles are relatively larger. The mastoids are developed into processes of the size and form which gave rise to the name. The stylohyals are anchylosed, and are supported anteriorly by a ridge from the tympanic called the 'vaginal process.' The eustachian process of the petrosal is shorter. A short styliform process is developed from the lower and outer angle of the alisphenoid. The glenoid cavity for the mandibular condyle is deeper, and is formed behind by the tympanic. There is also a low postglenoid prominence. The bony palate is much shorter, but is proportionally deeper and broader than in the Chimpanzees, and the teeth are arranged in a full semielliptic contour without any natural interspace, the crowns being of equal length. The incisors, premolars, and, above all, the canines are relatively smaller as compared with the true molars. The zygomata are shorter, thicker, and more arched upwards. The interorbital space is wider, the superorbital ridge is much less prominent, and the whole circumference of the orbits deviates more from the circular figure. The upper border of the squamosal describes a convex curve. The symphysis of the lower jaw is deeper and has a prominent inferior border or chin. The premolars have only one external fang, instead of two, as in the Chimpanzees.

5186. The atlas.

There is a tubercle from the hypapophysis representing the body, and a rough surface on the neural arch in place of a spine. The vertebral artery perforates the transverse process lengthwise, and afterwards grooves the neural arch behind the produced angles of the anterior zygapophysis. The body is longer and deeper in proportion to its breadth than in the Chimpanzee. The surface for the odontoid is more nearly circular and better defined. The cavities for the condyles are relatively larger, deeper, with their margins more produced. The pleurapophysial boundary of the vertebral arterial foramen is much thicker than the di-

apophysial one: they are equal in the Chimpanzee: the arterial foramina are relatively larger and the posterior zygapophyses are relatively much larger than in the Chimpanzee.

These differences chiefly relate to the more secure articulation and support of the vertically sustained head, and to the larger size of the cerebral organ in part nourished by the vertebral arteries, in the Human species. The development of the zygapophyses gives a greater antero-posterior extent to those parts of the atlas, and the transverse processes are thicker in proportion to their length.

5187. The axis.

The lower surface of the centrum is less flattened than in the Chimpanzee, the middle line being produced almost into a ridge. The transverse process is thicker and more obtuse in proportion to its length: both the anterior and posterior zygapophyses are relatively larger: the neural canal is relatively wider transversely: the neural spine is much less developed: in fact, what is usually described as the bifurcated spine of the axis seems rather to be the upper slightly produced extremities of the not completely coalesced neurapophyses of that vertebra in Man.

Lines drawn parallel with the transverse plane of the anterior zygapophyses would meet at a right angle in the Chimpanzee, but at a more open angle in Man, especially in the White races.

5188. The third cervical vertebra.

The anterior angle of the base of each neurapophysis is produced forwards beyond the centrum, and assists in forming, but in a less proportion than in the Chimpanzee, the transverse concavity for the backwardly produced body of the axis. The centrum is larger in proportion to the rest of the vertebræ than in the Chimpanzee, save in its antero-posterior dimension. The pleurapophysial part of the transverse process forms a distinct obtuse angle from the diapophysial part, which is shorter, thicker, and more obtuse than in the Chimpanzee. The same difference is here repeated in the greater relative size of the zygapophyses, particularly the anterior ones. The transverse diameter of the neural canal is relatively greater. The neural spine is much shorter and thicker.

5189. The fourth cervical vertebra.

The sides of the anterior concavity are still formed by the neurapophyses, which are less produced than in the preceding vertebræ, or than in the corresponding vertebræ of the Chimpanzee. The diapophyses and neural spine are shorter than in the Chimpanzee, especially the latter. The zygapophyses are relatively larger. The pleurapophysial and diapophysial parts of the transverse process are nearly equally developed, and are bent forwards on the sides of the groove which impresses the fore part of the transverse process. The pleurapophysial boundary for the canal for the vertebral artery is here much thinner than the diapophysial one.

5190. The fifth cervical vertebra.

The anterior concavity of the body is less deep than in the Chimpanzee. The antero-posterior extent of the centrum is absolutely less and relatively much less in breadth. The costal portion is now more developed than the diapophysial portion of the transverse process, which appears to form a short broad plate with the angles bent forwards. The zygapophyses are relatively much larger than in the Chimpanzee: the antero-posterior extent of the neural arch is greater: the neural spine is much shorter, thicker, and is sub-bifurcate. The anterior margin of the neural arch is sharper than in the Chimpanzee.

5191. The sixth cervical vertebra.

The Human characteristics of this vertebra are shown in the greater relative increase in the size of the centrum, especially transversely, with the minor degree of the anterior concavity and posterior transverse convexity of the centrum. The pleurapophysial parts of the transverse processes are more produced outwards in proportion to the diapophysial parts: the zygapophyses continue to present their characteristic superiority of size; and the neural spine, although here of greater length, is inferior in this respect to that in the Chimpanzee. The antero-posterior extent of the neurapophyses is greater in Man, and their anterior border is sharper.

5192. The seventh cervical vertebra.

The increase of breadth in the centrum, the increase of the antero-posterior extent of the neural arch, and in the length and thickness of the neural spine, is somewhat greater in this vertebra, as compared with the sixth cervical, than in the Chimpanzee. The costal part of the transverse process, completing the arterial foramen, is thicker than in the Chimpanzee: the diapophysis is shorter, but much thicker.

5193. The first dorsal vertebra.

The body is relatively larger than in the Chimpanzee, particularly anteriorly: it is less convex below. The transverse processes are thicker and are more inclined upwards and forwards: the spinous process is thicker and relatively shorter.

5194. The second dorsal vertebra.

The centrum is increased in vertical and antero-posterior extent: the anterior zygapophyses are nearer to each other and are produced more forwards than in the first dorsal, whereby the anterior notch of the neural arch becomes deeper and narrower. The diapophyses are longer and thinner. The neural spine is also thinner, and the posterior zygapophyses are smaller. This vertebra differs from its homologue in the Chimpanzee in the more upward direction of the diapophyses and the more outward aspect of their articular surface. The anterior emargination of the neural arch is less deep: the neural spine is absolutely shorter and smaller. The body is relatively as well as absolutely larger, and the pedicles of the neural arch are higher and longer in conformity with the wider neural canal.

5195. The third dorsal vertebra.

This differs from the second in a slight diminution in the transverse and increase in the vertical extent of the centrum: the diapophysis and neural spine are somewhat thicker: the anterior neural emargination is narrower. It differs from that of the Chimpanzee in the minor length of the neural spine, the greater relative breadth of the centrum, the greater length of the pedicles and concomitant expanse of the neural canal. The accessory tubercle is less distinctly developed upon the diapophysis.

5196. The fourth dorsal vertebra.

The same general differences, in comparison with the Chimpanzee, are repeated in this vertebra, with a greater development of the diapophysis upwards and an increased size of the accessory tubercle.

5197. The fifth dorsal vertebra.

This differs from the preceding vertebra in a slight increase of the centrum and in the length and backward inclination of the neural spine.

5198. The sixth dorsal vertebra.

5199. The seventh dorsal vertebra.

The progressive increase in the size of the centrum is greater, and the anterior and posterior costal surfaces are less equal and less approximated than in the Chimpanzee.

5200. The eighth dorsal vertebra.

The neural spines of this and the preceding dorsal vertebræ are shorter than in the Chimpanzee, are thicker transversely and less extended in the axis of the spine, especially at their extremities, which are tuberous, not truncate as in the Chimpanzee.

5201. The ninth dorsal vertebra.

The centrum is relatively larger, and the accessory tubercle above the diapophysis is more produced.

5202. The tenth dorsal vertebra.

This chiefly differs from the preceding in the absence of the posterior costal surface on each side.

5203. The eleventh dorsal vertebra.

The metapophysial tubercle which was slightly indicated in the preceding vertebra becomes more distinct. The centrum continues to increase in size.

5204. The twelfth dorsal vertebra.

The centrum continues to enlarge, and the neural spine to gain in antero-posterior extent. The metapophyses are well developed: the anapophyses may be recognized distinctly: the diapophyses are reduced to smooth tubercles without an articular facet. The neural arch of this vertebra contracts in breadth posteriorly, concomitantly with the modified shape and direction of the posterior zygapophyses, which are elongated and incline more obliquely outward than in the preceding vertebra. This modification does not characterize the corresponding vertebra in the Chimpanzee. The anterior emargination of the neural arch is wider in the twelfth dorsal, which is distinguishable from the eleventh not only by this character, but by the distinctness and greater length of the metapophyses, and by the greater length and minor breadth of the part of the neural arch supporting the posterior zygapophyses.

5205. The first lumbar vertebra.

The centrum is much increased in size, and the neural spine in extent. The metapophysial tubercles are also enlarged, but do not project so freely, by reason of the extension of the articular surfaces of the anterior zygapophyses upon the inner sides of their base. The diapophyses are much increased in length. The anapophysial tubercles are still distinct. The hinder half of the neural arch is more contracted than in the last dorsal, and the posterior zygapophyses are turned directly outwards.

5206. The second lumbar vertebra.

This chiefly differs from the first by a slight increase in the size of the centrum and in the length of the diapophysis. The anterior zygapophyses are larger and look more directly inwards. Both metapophysial and anapophysial tubercles are distinct. This vertebra differs from its homologue, the first lumbar vertebra, of the Chimpanzee, in the greater size of the body and neural arch, in the greater size of the zygapophyses as compared with the diapophyses, and more especially in the greater size of the neural spine. The anapophysial tubercles are better developed in the Human vertebræ, and are situated at the upper, and not at the hinder part of the base of the diapophysis. The backward production of the posterior zygapophyses occasioning the deep posterior emargination of the neural arch is also a characteristic distinction of the Human lumbar vertebræ.

5207. The third lumbar vertebra.

Both metapophysial and anapophysial tubercles continue distinct on this vertebra. The posterior margin of the neural spine projects distinctly behind two oblique ridges which

diverge from the sides of that spine upon the posterior zygapophyses: this character adds a marked distinction from the corresponding bone in the Chimpanzee to the other differences pointed out in the preceding lumbar vertebræ.

5208. The fourth lumbar vertebra.

This shows, like the corresponding vertebra in the Chimpanzee, a decrease in the length of the diapophysis, but it likewise shows a marked diminution in the antero-posterior extent of the neural arch, occasioned principally by a diminished length and increased breadth of the posterior zygapophysis. The anapophysial tubercles are distinctly developed. The body of the vertebra, though much broader, is not longer than that of its homologue, the third lumbar, in the Chimpanzee.

5209. The fifth lumbar vertebra.

This is characterized not only by its superior size, but by the great transverse expansion of the hinder part of the neural arch concomitant upon the superior development and outward expansion of the posterior zygapophyses. The diapophyses and neural spine are shortened: the anapophyses appear like a part of the upper border of the base of the diapophysis pinched up and produced backwards. The metapophysial tubercles are separated by a groove from the anterior zygapophyses.

5210. The sacrum.

This consists of five anchylosed vertebræ. They differ from the sacral vertebræ of the Chimpanzee by their greater breadth and by their anterior concavity both lengthwise and transversely. The nervous foramina are relatively much larger: the spinous processes are shorter and thicker. The two anterior sacrals and a small part of the third form the sacro-iliac joint. The neural arch of the last two sacral vertebræ is incomplete.

5211. The first coccygeal vertebra.

It is less flattened and is shorter than in the Chimpanzee: the neurapophyses are longer, the diapophyses are shorter.

5212. The first pair of ribs and manubrium sterni.

The neck of the rib is longer in proportion to the body, and this is relatively broader and flatter than in the Chimpanzee. The whole rib describes a greater portion of a circle. The manubrium is longer in proportion to its breadth, and the two clavicular tuberosities are more developed.

5213. The second pair of ribs.

The cervix is relatively longer, and the entire rib describes a greater curvature, than in the Chimpanzee. It presents, also, a ridge and a groove on the upper part of the vertebral third, which is not present in the Chimpanzee, and it is more flattened in the rest of its extent.

5214. The seven succeeding pairs of ribs.

These differ from those of the Chimpanzee in their greater thickness and breadth as compared with their length, in their greater degree of curvature, especially at their vertebral or proximal halves, and the greater production of the inferior margin, which forms a deeper groove for the intercostal nerves and vessels.

5215. The tenth pair of ribs.

A rough ligamentous tract takes the place of the articular surface of the tubercle. The rib is absolutely shorter than in the Chimpanzee, but is much broader and more curved.

5216. The eleventh pair of ribs.

There is no articular tubercle: the rib is shorter, broader, and more curved than in the Chimpanzee.

5217. The twelfth pair of ribs.

These are much shorter than in the Chimpanzee, and are very little broader in proportion to their length. They become narrower towards their sternal end, which shows a much smaller surface for the articulation of the cartilage. They differ also, like the preceding, in the absence of the articular tubercle, which is developed in the homologous rib in the Chimpanzee.

5218. The body of the sternum and the osseous piece supporting the ensiform cartilage.

The elements of the body have coalesced and formed a bone broader, flatter, and more compressed from before backwards than in the Chimpanzee; it is also more expanded at its lower half. The sternum of the Orang approaches nearer to the form of that of Man than the sternum of the Chimpanzee does.

5219. The right clavicle.

The bone, besides its superior size, differs from that of the Chimpanzee in the more graceful and complete sigmoid curvature. The sternal end is more thickened, and the articular

surface is deeper than it is wide: the rough surface beneath that end is not present in the Chimpanzee. The supracoracoid ridge is less prominent: the acromial extremity is broader, flatter, and more rounded.

5220. The left clavicle.

5221. The right scapula.

It is broader in proportion to its length than in the Chimpanzee: the infraspinal surface is relatively larger; the supraspinal one is less; but the superior costa is longer, and forms a more marked angle with the contiguous part of the base of the scapula. The suprascapular notch is smaller: the spine of the scapula is less oblique and thicker; its free rough margin, especially, is much more expanded. The coracoid, though broad, contracts rather more at its fixed extremity than in the Chimpanzee. The upper end of the ovate glenoid cavity is narrower in Man. The subscapular fossa is broader, that surface of the scapula being more concave than convex, while the reverse proportions obtain in the Chimpanzee. The rough thickened border of the inferior costa is much broader and thicker. The tubercle for the long head of the triceps is larger and better marked. The coracoid is more curved in proportion to its length: it is absolutely shorter in the White varieties of the Human race.

5222. The left scapula.

5223. The left humerus.

This is more slender in proportion to its length than in the Chimpanzee, and is much shorter and thinner than in the Gorilla: it equals in length the humerus of the Orang, which it also resembles in the less development of the proximal tubercle and the less depth of the bicipital groove, as compared with the Chimpanzee; but it resembles the Chimpanzee's humerus in the stronger deltoid ridge, which defines the antero-internal flattened surface of the proximal half of the shaft; but this surface is not so well defined on the inner side by the pectoral ridge, as in the Chimpanzee. The articular head is longer vertically, forming a full oval; it is hemispheric in the Chimpanzee. The supinator ridge is less produced and less sharply defined than in the Chimpanzee or Orang. The ectocondyloid tuberosity is less produced, and the entocondyloid one terminates more obtusely: it presents a rough flattened surface in the Chimpanzee and Orang. The olecranal fossa is wider, but less deep and less sharply defined than in the Chimpanzee. The articular surface constitutes a greater proportion of the breadth of the distal extremity of the humerus than in the Chimpanzee: the trochlear ridge defining the radial tuberosity from the ulnar concavity is much less developed than in the Chimpanzee. The distal third of the humerus is curved more forwards, and the breadth of both extremities of the bone is absolutely as well as relatively less than in the Chimpanzee.

5224. The left radius.

It is straighter and less expanded at its distal end than in the Chimpanzee. The margin of the circular proximal articulation is less obtuse, but at the same time less produced, so that what may be called the neck of the bone which intervenes between this surface and the bicipital tuberosity is less defined: it is thicker and shorter, and is more in a line with the shaft of the bone, in Man. The depression for the 'extensor digitorum' is less deep, the bounding ridges being less developed in Man; and the same may be said of the contiguous grooves for the extensors of the thumb and index finger. The tuberosity for the insertion of the great supinator muscle is less developed. The radial end of the distal articular surface is narrower; but in the form of the surface for the ulna and the prominence of the anterior angle, the Chimpanzee comes nearer to Man than the Orang does.

5225. The left ulna.

It closely corresponds in length and general proportions with that of the Chimpanzee, but its distal half is somewhat more slender. The ulnar boundary of the great sigmoid cavity is interrupted by a deeper groove, but not to the same extent as in the Chimpanzee: the radial side of the sigmoid cavity extends, as in the Chimpanzee, to the back part of the olecranon. The lesser sigmoid cavity is transversely oblong, not produced downwards into the semicircular form; it also extends to the posterior surface of the ulna, which is not the case in the Chimpanzee. That surface is broader and less convex along the proximal half of the ulna than in the Chimpanzee. The ridge and fossa for the origin of the flexor profundus are less sharply defined and are shorter than in the Chimpanzee. The interosseous angle is much better marked along the middle of the shaft of the bone; but this part is straighter in Man, not bent forwards as in the Chimpanzee. The antero-posterior diameter of the distal end is less in proportion to the transverse, and the groove between the radial tubercle and styloid process is less marked.

5226. The right humerus.

5227. The right radius.

5228. The right ulna.

5229. The right scaphoïdes.

It is smaller than that of the Chimpanzee, and its convex side is more equally divided by a constriction into the radial and trapezial portions. The radial portion is a triangular convexity with the angle rounded off, and forms an obtuse angle with the trapezial convexity, which is ovate: they are divided by a broader tract than in the Chimpanzee. The obtuse ulnar angle is much less produced: the concavity for the magnum is deeper and better defined than in the Chimpanzee.

5230. The right lunare.

It is more nearly equal in size to that of the Chimpanzee than the scaphoïdes is. The posterior boundary of the unciform cavity is thicker and less angular: the surface for the cuneiforme is less extensive and less flat.

5231. The right cuneiforme.

The thickness of this bone in the axis of the wrist is much greater than in the Chimpanzee, especially at the back part, which is crossed by a thick rounded transverse bar. The surface for the lunare is more concave, that for the pisiforme is more elongated, than in the Chimpanzee.

5232. The right pisiforme.

This is much shorter than in the Chimpanzee.

5233. The right trapezium.

The bone is thicker in proportion to its breadth: instead of the tuberosity there is an oblique ridge upon the upper surface: the surface for the scaphoid is larger, as is also the concavo-convex surface for the metacarpal of the thumb, than in the Chimpanzee.

5234. The right trapezoïdes.

The surfaces for the trapezium and the scaphoïdes meet at a less acute angle than in the Chimpanzee, and the back surface of the bone is less convex.

5235. The right os magnum.

The surface for the unciforme is divided into two, and is not continuous as in the Chimpanzee. That for the middle metacarpal is broader transversely, shorter from before backwards, and is not emarginate on either side.

5236. The right unciforme.

This is smaller than in the Chimpanzee. The surface for the os magnum, which is a continuous elongated tract in the Chimpanzee, is divided into two in Man: the surfaces for the fourth and fifth metacarpals are smaller and more simple in Man: they are continued upon the unciform process, and each surface upon the body of the unciforme presents a smooth protuberance adapted to corresponding concavities at the base of the metacarpals, which is not the case in the Chimpanzee.

5237. The metacarpal of the right pollex.

It is much longer than in the Chimpanzee.

5238. The metacarpal of the right index.

It is one-fourth shorter than in the Chimpanzee, but is a thicker bone. The proximal articulation is concave transversely, but not angularly impressed or notched anteriorly as in the Chimpanzee: the surface for the adjoining metacarpal, which is divided by a groove in the Chimpanzee, is here single. The shaft of the bone is straighter, the back part flatter, and its distal convexity broader, than in the Chimpanzee.

5239. The metacarpal of the right medius, or third digit.

It is one-third shorter than in the Chimpanzee, and does not equal in length the metacarpal of the index. The proximal articular surface is almost flat, and is continued into the lateral surface upon each side of the base. The bone is straighter, and the plantar surface more acute, than in the Chimpanzee.

5240. The metacarpal of the right annularis, or fourth digit.

This bone is more than one-third shorter than the corresponding bone in the Chimpanzee. The proximal articular surface is nearly flat, and is narrower transversely than in the Chimpanzee. The surface for the middle metacarpal is divided by a groove into two portions, the one next the back of the bone being insulated, not continuous with the proximal surface as in the Chimpanzee.

5241. The metacarpal of the right minimus, or fifth digit.

This is shorter, but is broader transversely, than the preceding, and its proximal articular surface is more extended transversely than in the Chimpanzee.

5242. The proximal phalanx of the right pollex.

This is longer and thicker than in the Chimpanzee.

5243. The proximal phalanx of the right index.

5244. The proximal phalanx of the right medius.

5245. The proximal phalanx of the right annularis.

5246. The proximal phalanx of the right minimus.

5247. The ungual, which is the second, phalanx of the right pollex.

This is much broader than in the Chimpanzee.

5248. The second phalanx of the right index.

5249. The second phalanx of the right medius.

5250. The second phalanx of the right annularis.

5251. The second phalanx of the right minimus.

These phalanges are shorter, less bent, and less expanded at the middle, than in the Chimpanzee.

5252. The ungual phalanx of the right index.

5253. The ungual phalanx of the right medius.

5254. The ungual phalanx of the right annularis.

5255. The ungual phalanx of the right minimus.

These are more expanded at their extremities than in the Chimpanzee.

5256. The bones of the left hand.

5257. The right os innominatum.

5258. The left os innominatum.

The Human characteristics are strongly marked in this part of the skeleton. The ilium is broader than it is long, and is more concave anteriorly, than in the Chimpanzee; it is also more concave posteriorly, especially in the vertical direction, in which it is slightly convex in the Chimpanzee. The sacro-iliac symphysis is subquadrate, broader than it is long, instead of being long and narrow as in the Chimpanzee. The labrum is much thicker and much more curved; and both angles, but especially the posterior one, are much more produced. These modifications relate chiefly to the needful increased surface of attachment for the large muscles which sustain the trunk upright upon the hinder, now become the lower, limbs.

The anterior border of the ilium is much shorter and thicker; there is no trace of that accessory small tubercle which is observable in the Chimpanzee above the larger supracotyloid rugosity. The acetabulum is nearly double the size of that in the Chimpanzee, but does not exceed that of the Gorilla: it is turned more towards the back of the os innominatum. The great ischiatic notch is shorter, but much deeper; the spine of the ischium is more produced; the lesser ischiatic notch is more concave, but of the same length. The tuberosity of the ischium is convex, and is continued upon the outer part of the bone to near the acetabulum; in the Chimpanzee it is more flattened, is carried further down from the acetabulum, and its outer margin is produced. The pubis is shorter and much thicker than in the Chimpanzee. The symphysial boundary of the obturator foramen is much narrower and less curved. The form of that foramen, which is of the same size as in the Chimpanzee, is different, the great end of the oval being upwards, instead of downwards: its shape is further modified in the Chimpanzee by a thin angular process of bone which projects from the acetabular border. This process is not present in the Orang-utan, in which the foramen is larger than in the Chimpanzee, with the small end of the oval upwards and the long axis of the foramen directed as in the Chimpanzee from above downwards and forwards instead of downwards and backwards as in Man. The oblique groove beneath the pubic boundary of the foramen in Man is not present in either the Chimpanzee or Orang-utan. The cotyloid notch is narrower in the Chimpanzee than in Man, and is still more contracted in the Orang-utan. The symphysis pubis is much shorter than in either of the great Anthropoid apes.

5259. The right femur.

5260. The left femur.

This bone is three-sevenths longer than in the Chimpanzee: the shaft is more cylindrical; and, instead of being subcompressed from before backwards, the back part is produced into an obtuse ridge or 'linea aspera,' which is feebly marked in the Gorilla. The head is relatively larger as compared with the shaft: the neck is longer, but less thick: the angle at which it leaves the shaft is more obtuse in the present specimen from the Negro, but such is not the case in other Human femora, especially of the White races. The pit for the ligamentum teres is more excentric: the depression near the great trochanter at the root of the neck is smaller; the anterior ridge or rugosity defining the neck is not present in the Chimpanzee. The lesser trochanter projects less backwards and more inwards than in the Chimpanzee. The condyles are more suddenly expanded in Man: the rotular trochlea is deeper: the antero-posterior extent of the condyles is greater, especially of the outer one; but the ectocondyloid tuberosity is less marked and less uneven: the breadth of the articular surface of the two condyles is nearly equal, especially posteriorly. The intercondyloid notch is deeper, owing to the more backward production of the condyles. The entocondyloid tuberosity is less produced. The inner condyle is more produced in the axis of the bone, which makes the shaft incline outwards when the two condyles rest on a horizontal surface. In the Gorilla, Chimpanzee and Orang, the shaft of the femur rises perpendicularly above the condyles similarly placed on a flat surface.

5261. The left tibia.

The distal end and a great part of the shaft are tumid and diseased: it is partially anchylosed to the astragalus, which has participated in the disease.

5262. The right tibia.

This is in a sound state. The bone is two-fifths longer than in the Chimpanzee. The articular surface upon the inner tuberosity is semi-oval instead of being semicircular as in the Chimpanzee, and its longest diameter is from before backwards: this modification relates to the corresponding modification of the inner condyle of the femur. The interarticular spine, which is simple in the Chimpanzee, is here bifurcate. The border of the proximal tuberosities, formed by the original epiphysis, is thicker or deeper, especially round the inner side. The surface for the fibula is much smaller than in the Chimpanzee, and the proximal end of the tibia is less produced at that part backwards. The shaft is straighter, and is trihedral, the posterior surface being more expanded and better defined by ridges from the surfaces which converge to the anterior ridge. There is no rough depression on the inner side of the proximal part of the ridge corresponding with that which is so strongly marked in the Chimpanzee. The astragalar surface is triangular rather than subquadrate, owing to its greater antero-posterior expansion at the outer part; this difference is less marked in the variety under comparison, in which, also, the shaft is more compressed from side to side, especially at its proximal half, than in the White races.

5263. The right fibula.

5264. The left fibula.

A greater part of the shaft is swollen, and exhibits other marks of inflammation and disease. As compared with the same bone in the Chimpanzee, the fibula, besides the greater relative length and slenderness of the shaft, has a proportionally smaller head, the articular facet on which is more oblique, and the prominence anterior to it less produced: the prominence beneath it next the tibia is, however, broader than in the Chimpanzee. The form of the shaft is more three-sided; a transverse section of that of the Chimpanzee would be semi-oval. The distal enlargement is relatively less, and its articular surface smaller.

5265. The right astragalus.

Besides its superior size, this differs from the astragalus in the Chimpanzee, in the greater relative breadth of the tibial trochlear surface; in the less extent of its outer or fibular surface, the lower angle of which is much less produced outwards; and in the absence of the depression on the surface for the inner malleolus. The upper surface is slightly prolonged upon the posterior prominence, which is longer but less deeply grooved than in the Chimpanzee. The tubercular boundaries of the groove, especially the outer one, are less produced. The outer concavity for the calcaneum is broader than in the Chimpanzee; the anterior cal-

caneal convexity is larger; the intervening groove is narrower and deeper: the scaphoid tuberosity is larger in proportion to the body of the bone, and the part supporting it is thicker and shorter.

5266. The right calcaneum.

The superiority of size is still greater in this bone as compared with that in the Chimpanzee, and is principally due to the greater expansion and production of the posterior tuberosity, which expands instead of contracting towards the sole. The broad, rough, flattened, inferior surface of the Human calcaneum offers a marked contrast with the smooth narrow concavity of the same part in the Chimpanzee, and obviously relates to the plantigrade character of Man. All the articular surfaces, but especially the cuboidal one, are larger in Man. The prominence supporting the inner astragalar surface is less produced, and the groove for the flexor tendons is wider and shallower in Man: the external tuberosity, especially, is much more feebly developed, and less defined, than in the Chimpanzee.

5267. The right naviculare.

This is shorter transversely, its increase of size being a little in depth, but chiefly in antero-posterior extent, and this more manifestly at the outer than the inner side, whence results a more vertical position of the cuneiform facets, which are flatter and more nearly upon the same plane, than in the Chimpanzee. The surface for the cuboid is shorter and broader, although it extends across only half that end of the naviculare, instead of across the whole, and joining the astragalar concavity, as in the Chimpanzee. The internal tuberosity is, however, less produced than in the Chimpanzee.

5268. The right entocuneiform, or 'os cuneiforme internum.'

This is larger than in the Chimpanzee, and presents a smaller and flatter facet to the naviculare and a smaller facet for the second metatarsal, which, also, is distinct from the surface for the mesocuneiform, instead of being confluent therewith, as in the Chimpanzee. But the most characteristic difference between the entocuneiform of Man and the Chimpanzee is seen in the shape of the surface for the metatarsal of the hallux, which is flat in Man, but is convex transversely in the ape, to allow of the free movements of approximation and separation of that toe from the rest, required by its function as a thumb in the act of grasping and climbing.

5269. The right mesocuneiform, or 'os cuneiforme medium.'

This bone is larger than in the Chimpanzee, especially in depth: the upper surface is nearly as flat; the surface for the entocuneiform is divided by a vertical groove; that for the ectocuneiform extends across the whole of the upper half of the outer surface in the Chimpanzee, but in Man is limited to the posterior half of the same surface.

5270. The right ectocuneiform, or 'os cuneiforme externum.'

This is considerably larger than in the Chimpanzee, but the increase is chiefly in the antero-posterior direction. The navicular surface is more oblong, the posterior cuboidal surface is larger and more widely separated from the anterior one, and the surface for the middle metatarsal is nearly similar in size and shape.

5271. The right cuboïdes.

This bone is larger in all its dimensions than the corresponding one in the Chimpanzee, but the anterior surface for the ectocuneiform is much less; the calcaneal and metatarsal facets, which are divided only by the peroneal groove in the Chimpanzee, are here separated by a tuberosity as well as by a groove. The inferior tuberosity in Man is less prominent and definite, but the rough inferior surface behind it is much more extensive.

5272. The metatarsal of the right hallux, or great toe.

This is rather longer and is much thicker and more expanded, especially at its distal end, than in the Chimpanzee. The chief difference is in the form of the proximal articular surface, which is almost flat, not concave as in the Chimpanzee. The distal condyle is less prominent than in the Chimpanzee.

5273. The metatarsal of the right second toe.

Its length is the same as in the Chimpanzee, but it is of less vertical breadth, and its upper surface is straight, whilst the whole bone in the Chimpanzee is bent towards the sole. The surface for the entocuneiform is smaller: there is also an additional inferior surface for the ectocuneiform which does not exist in the Chimpanzee.

5274. The metatarsal of the right third toe.

It presents the same general differences of shape as compared with that in the Chimpanzee which were noticed in the foregoing metatarsal. The proximal articular surface has the notch on the outer, but not that on the inner side as in the Chimpanzee.

5275. The metatarsal of the right fourth toe.

Besides the differences of shape and curvature of the shaft, the proximal articulation is flatter and more distinct from that for the third metatarsal.

5276. The metatarsal of the right fifth toe.

This differs in a greater degree from the fifth metatarsal in the Chimpanzee by its superior transverse extent, the shaft being slightly flattened from above downwards, whilst in the

Chimpanzee it is flattened from side to side except at the proximal enlargement. The surfaces for the cuboid and contiguous metatarsal meet at a less open angle than in the Chimpanzee.

5277. The proximal phalanx of the right hallux.

It is much larger than in the Chimpanzee.

5278. The proximal phalanx of the second toe.

5279. The proximal phalanx of the third toe.

5280. The proximal phalanx of the fourth toe.

5281. The proximal phalanx of the fifth toe.

These are shorter, straighter, and less compressed than in the Chimpanzee.

5282. The second, which is the ungual, phalanx of the right hallux.

This is broader and flatter than in the Chimpanzee.

5283. The bones of the left foot, answering to those, above specified, of the right foot.

5284. The patellæ.

The following, to No. 5303 inclusive, are parts of the same skeleton of a male Australian:—

Presented by Governor Sir George Grey, C.B.

5285. The skull.

The squamosals reach the frontals. The paroccipitals are small, especially on the left side.

5286. The atlas.

5287. The axis.

5288. The fourth to the seventh cervical vertebræ.

5289. The second to the seventh dorsal vertebræ.

5290. The three succeeding dorsal vertebræ.

5291. The eleventh dorsal vertebra.

The neurapophysis supports an articular surface for a rib.

5292. The twelfth dorsal vertebra.

The articular surface for the rib is on the neurapophysis: a long and strong metapophysis is developed from the back part of the short and stunted diapophysis.

5293. The five lumbar vertebræ.

The diapophyses increase in length from the first to the third, and then diminish to the fifth, where they are the strongest, although the shortest. The metapophyses and anapophyses are distinct in the first four vertebræ.

5294. The sacrum.

The neural canal is closed by the neurapophyses and spines in the first three vertebræ. The whole sacrum is small, compressed, and its anterior surface is almost straight, not curved.

5295. The right clavicle.

5296. The left scapula.

5297. The left humerus.

5298. The left ulna.

5299. The left radius.

5300. The ossa innominata.

5301. The left femur.

5302. The left fibula.

5303. The left tibia.

5304. The skull of a male Australian, of the Western Port tribe, with the permanent dentition complete and moderately worn.

A very small portion of the alisphenoid joins the parietal on both sides of the head. In the narrow form of the cranium, the low receding forehead, the prominent obtuse borders of the orbits, the prominence of the jaws, and advanced position of the canines of the lower jaw, this skull presents, irrespective of any artificial distortion, the lowest character of any Human skull in the Museum; but in all the essentials it adheres to the Human type and departs from that of the Gorilla and Chimpanzee.

Presented by Dr. Hobson.

5305. The skull of a male Australian, from the neighbourhood of Port Adelaide.

A small portion of the alisphenoid joins the parietal on both sides of the head. A well-marked ridge is continued from the hinder root of the zygoma to where the squamosal suture joins the additamental one.

Presented by Governor Sir George Grey, C.B.

5306. The skull of a male Australian.

The alisphenoid joins the parietal on both sides of the head. The supramastoid ridge is less marked than in the preceding skull. The characteristic overarching of the short and broad nasals by the superorbital prominence, continued across the glabellæ, is exaggerated in the present skull. The paroccipital tuberosities are well marked, and the vaginal processes are unusually developed.

Presented by George Bennett, Esq., F.L.S.

5307. The cranium of an Australian, from Murrumbidgee, near Sydney.

The apex of the left alisphenoid joins the parietal; a wormian ossicle is interposed on the right side. The glabellar and superorbital ridges present the prominence and thickening, beneath which the short curved nasals have the sunken position common to the Australian race. The molars show the large size characteristic of the same race.

Presented by George Bennett, Esq., F.L.S.

5308. The skull of a male Australian, wanting many of the teeth, and with the left zygoma broken.

A small part of the alisphenoid joins the parietal: the supramastoid ridge is feebly marked: the paroccipital ridges are distinctly marked, and the vaginal processes are produced into a point.

Presented by Dr. Hobson.

5309. The skull of a female Australian from Port Essington.

The right anterior incisor has been removed during life and the socket is obliterated. The last true molars have not come into place. The alisphenoid joins the parietal on both sides of the head. The eustachian processes are unusually developed, especially on the right side, together with the styliform processes of the sphenoid.

Presented by J. B. Jukes, Esq., F.G.S.

5310. The cranium of a male Australian, with the upper molars much worn.

A small portion of the alisphenoid joins the parietal on both sides of the head. The supramastoid ridge is present. The aperture of each auditory meatus is partially filled up by smooth bony tumours from the inner surface of the tympanic, whose outer expanded end is well indicated by the fissure and ridge anterior to the mastoid. The eustachian processes are well marked: the biventer grooves are unusually deep and well defined.

Hunterian.

5311. The cranium of a male Australian.

The alveolar part of the upper jaw is more than usually produced: the alisphenoid joins the parietal on both sides. There is a supramastoid ridge, below which is the narrow fissure and ridge indicating the outer extremity of the anchylosed tympanic.

Mus. Brit.

5312. The cranium, wanting the right temporal bone, of an Australian.

The alisphenoid joins the parietal on both sides of the head. The last true molar is not fully developed on the left side, and near it is a small supplementary tooth, in a distinct compartment of the alveolus. The paroccipital prominences are well marked.

Hunterian.

5313. The cranium, wanting most of the teeth, of an Australian.

A small portion of the left alisphenoid joins the parietal; on the right side a wormian bone intervenes, which seems to be rather a dismemberment of the squamosal. The right jugular fossa is disproportionately large.

Hunterian.

5314. The skull of an Australian from the Western coast.

A small portion of the alisphenoid joins the parietal on both sides of the head. The supramastoid ridge is strongly developed on the right side. The suborbital fossæ are deep.

Presented by Dr. Hobson.

5315. The cranium of a female from 'Port Fairy,' in the Port Phillip district.

The squamosals join the frontals on both sides: a small wormian bone is partially interposed on the left. The parietes of the cranium have been injured, apparently after death.

Presented by C. G. Burchett, Esq.

5316. The skull of an Australian.

The right anterior incisor has been removed during life, and the alveolus is obliterated. The apex of the narrow alisphenoid just reaches the parietal on both sides of the head. The roots of the teeth are exposed on the right side, showing the outer root of the premolars to be single, that of the large true molars double, in both jaws.

Presented by Prof. Owen, F.R.S.

5317. The cranium, vertically and longitudinally bisected, of an Australian, from Port Essington.

This is unusually compressed and arched from before backwards: the squamosal joins the frontal on the right side; a wormian bone is interposed on the left. The right suborbital fossa is deep: the supramastoid ridge is strongly developed on both sides. The parietes of

the cranium are thick, dense, with little diplöe in the parietal part. The rhinencephalic fossa is narrow and deep. The sinuses from the nasal cavity do not ascend above, or penetrate the glabellar prominence.

Presented by J. B. Jukes, Esq., F.G.S.

5318. The cranium of an aged Australian of the Port Phillip district.

The alisphenoids are broader than usual in this skull, and join the parietals. The calvarium has been removed, by a section through the glabellar prominences indicative of the frontal sinuses, but these have not been developed, and the bone is occupied there by a minute cancellous structure or diploë.

Presented by Dr. Hobson.

5319. The cranium of an Australian of King George's Sound.

The alisphenoid joins the parietal on the left side; a wormian bone is interposed on the right. There is a marked indentation at the sides of the deltoid suture.

Presented by Captain Philip King, R.N.

5320. The skull of a male Tasmanian, or aboriginal of Van Diemen's Land.

The last molar is not fully in place in the upper jaw. The apex of the alisphenoid reaches the parietal on both sides of the head.

Presented by Ronald Gunn, Esq.

5321. The skull of a female Tasmanian.

The right last molar is not fully in place. The alisphenoid joins the parietal on both sides. This skull is remarkable for having but three inferior incisors, the middle one on a line with the symphysis, and opposing the interspace of the two upper middle incisors, without any trace of the obliterated socket of the defective median incisor.

Presented by G. J. Guthrie, Esq., F.R.S.

5322. The skull, with the atlas, of a female Tasmanian.

The last true molar is not in place in either jaw. This skull presents the same variety of the inferior incisors and the same absence of any trace of the previous existence of the missing one. The alisphenoid joins the parietal on both sides of the head.

Presented by Sir Everard Home, Bart., V.P.R.S.

5323. The skull of a female Tasmanian.

The last true molar is concealed in the formative alveolus in both jaws. The alisphenoid joins the parietal on the right side; a wormian ossicle is interposed on the left side. The os frontis shows traces of the effects of a severe blow. The sockets of the inferior incisors are in the normal number and position.

Presented by Ronald Gunn, Esq.

5324. The cranium, vertically and longitudinally bisected, of a male Tasmanian.

The characteristic thickness of the cranial walls is unusually well marked, with the absence of the frontal sinuses. The alisphenoid joins the parietal on the left side; a wormian ossicle is interposed on the right side. The styliform process of the sphenoid is well developed, and is applied against a ridge of the petrosal. The premaxillary suture may be traced from the palate along the incisive foramen into the nostril. The contiguous parts of the second bicuspis and first molar of the left upper jaw are decayed, which is a rare circumstance in this race.

Hunterian.

5325. The cranium, vertically and longitudinally bisected, of a male Tasmanian.

The alisphenoid joins the parietal on both sides of the head: the frontal protuberances are filled with a cancellous diploë. The teeth have been much worn.

Presented by Ronald Gunn, Esq.

5326. The cranium of a female Tasmanian.

The right last molar has not come into place. The right alisphenoid joins the parietal: a wormian ossicle is interposed on the left side. The worn crown of the first true molar well indicates the early period at which this tooth of the permanent series comes into place. The paroccipital tubercle is well developed, especially on the right side.

Hunterian.

5327. The fore part of a vertically and transversely bisected cranium of a female Tasmanian.

A wormian bone is interposed between the alisphenoid and the parietal on both sides of the head.

Presented by Ronald Gunn, Esq.

5328. The cranium, with the zygomata fractured, of a male Tasmanian.

The teeth have been worn down to the stumps. A section has been made across the frontal protuberances, showing that the sinuses have extended into them.

Presented by Dr. Hobson.

5329. The cranium of an Australian.

It has been stained of a black colour, showing well, by contrast, the enamelled crowns of the characteristically large molars and premolars. A wormian ossicle is interposed between the alisphenoid and parietal on both sides.

Presented by Ronald Gunn, Esq.

5330. The cranium, wanting the lower jaw, of an Australian of Port Essington.

The apex of the alisphenoid joins the parietal on the left side; a wormian bone is interposed on the right. The eustachian processes of the petrosal are remarkably developed in this skull.

Presented by J. B. Jukes, Esq., F.G.S.

5331. The cranial part of the skull of an Australian from the vicinity of Port Adelaide.

It has been converted by the Natives into a water vessel. The sutures have been covered by a bituminous substance with fragments of a nacreous shell, and a handle has been spun out of some native grass and passed through the foramen magnum and the interorbital space which is broken away, for the purpose of suspending this primitive work of art. The external orbital angles, from their worn and polished surface, appear to have served as the spouts of the vessel. From the size of the cranium, of the mastoid processes, and of the lambdoidal and occipital ridges, this has belonged to a powerful male. The styliform eustachian process is preserved on the left side. The zygomatic arches have been removed, and the fractured roots smoothly rounded off.

Presented by Governor Sir George Grey, C.B.

5332. The cranial part of the skull of an Australian of Port Adelaide.

It has been converted in the same way into a drinking vessel. The eustachian processes are well marked.

Presented by Governor Sir George Grey, C.B.

5333. The cranial portion of the skull of an Australian of Port Adelaide.

It has been similarly converted into a drinking vessel. The left squamosal joins the frontal, but is separated by the junction of the parietal with the sphenoid on the right side.

Presented by Governor Sir George Grey, C.B.

5334. The cranial portion of an Australian of Port Adelaide.

It has been similarly converted into a drinking vessel. The alisphenoid joins the parietal on both sides.

Presented by Governor Sir George Grey, C.B.

5335. The cranium of a female Australian, from Port Essington.

It shows the narrow cranium, large prominent jaws, large molars, and regular curvature of the upper contour of the cranium, characteristic of the Australian race, but without the prominence of the glabella and supraorbital ridge. The last molars are still concealed in their alveoli.

Presented by J. B. Jukes, Esq., F.G.S.

5336. The cranium of an Australian boy, from Port Essington.

The last deciduous molar has not been shed, and the last true molar not developed: the first true molars present the characteristically large size. The operation of knocking out the right median incisor has already been performed, and its alveolus is obliterated. The left alisphenoid joins the parietal; a wormian ossicle is interposed in the right side. The eustachian processes are well developed. The characteristic prominence of the glabella and supraorbital ridges has already begun to manifest itself.

Presented by J. B. Jukes, Esq., F.G.S.

The following, to No. 5343 inclusive, are parts of the same skeleton of a young female Australian, from Port Essington:—

Presented by J. B. Jukes, Esq., F.G.S.

5337. The cranium.

The last true molar is not developed. The alisphenoid joins the parietal on both sides of the head. The styliform processes are unusually produced towards the ectopterygoid plates.

5338. A thoracic rib.

5339. The right clavicle.

5340. The humeri.

The proximal epiphysis is wanting: there is a large intercondyloid perforation: the distal epiphysis is in three pieces, one forming the radial tubercle, a second forming the sigmoid cavity, and a third forming the inner condyle.

5341. The right ulna.

The distal epiphysis is wanting.

5342. The femora.

The distal epiphysis is wanting. The head and great trochanter remain attached to the left femur, but the head is wanting in the right femur.

5343. The shafts of the tibiæ.

They present the characteristic compression and anterior convexity.

5344. A great portion of the calvarium of a skull of an Australian, of Port Adelaide.

Presented by Governor Sir George Grey, C.B.

5345. The cranium of an Australian child, from Van Diemen's Land.

On the left side a wormian ossicle is interposed between the alisphenoid and parietal, on the right side two such ossicles are interposed. The characteristic large size of the crowns of the first true molars is well shown, although they are yet in their formative alveoli.

Presented by Thomas Hobbs Scott, Esq.

Besides the narrow cranium, with its contracted and retreating forehead and the prognathic jaws common to the Melanian races, the Australian skull is characterized by the thick and prominent superorbital ridge, which is continued across the glabella and overhangs the deep-set, small, and slightly prominent nasals: another well-marked characteristic is seen in the large proportional size of the molars, premolars and canines, but more especially of the

molars, and in the almost constant distinction of the two external fangs of these teeth, in both jaws. In most skulls the vertex is raised, and the antero-posterior contour of the calvarium describes a full and pretty regular curve. The sides of the calvarium slope away from the sagittal elevation. The sutures are less dentated. The malar bones are small, but moderately prominent and rugged. The alisphenoid is narrow, and the squamosal is unusually closely approximated to the frontal, if it does not directly articulate with it. The frontal sinuses are seldom developed.

5346. The cranium of a Papuan native of one of the islands in Torres' Straits.

In the large size of the molars, the prominence of the uninterrupted supraorbital ridge, the sunk position of the small nasals, the sloping of the sides of the contracted cranium from the raised and regularly curved sagittal portion, and in the small proportion of the alisphenoid which joins the parietal, this cranium conforms to the Australian type of the Melanian variety. The styliform processes of the alisphenoid are unusually prolonged and pointed.

Presented by J. B. Jukes, Esq., F.G.S.

5347. The cranium of a Papuan native of one of the islands in Torres' Straits.

The supraorbital prominence is less marked, the nasals are larger and less sunk, the cranium is broader at the parietal protuberance, but the other characteristics of the Australian type are well marked.

Presented by J. B. Jukes, Esq., F.G.S.

5348. A mutilated skull of a Papuan, from Wyer, an island at the eastern extremity of Torres' Straits.

In this the glabellar prominence is less marked and the nasals are less sunk than in the Australians; and the parietal prominences are as well indicated as in the preceding skull. There is a short styliform process before as well as behind the foramen spinosum. A section of the glabella has been made, showing the frontal sinus continued into the right frontal protuberance.

Presented by J. B. Jukes, Esq., F.G.S.

5349. The skull of a male Papuan, from Darnley Island, Torres' Straits.

The cranial portion is larger, especially in its antero-posterior diameter, than in any of the preceding skulls. The supraorbital ridge is not more developed than in the White races. The nasal bones are longer and resemble in proportions those of No. 5347. The forehead, although higher, is narrow, and the jaws are prognathic. The molars, especially the last, are relatively smaller than in the Australian variety. A wormian ossicle is interposed between the alisphenoid and parietal on both sides of the head.

Presented by J. B. Jukes, Esq., F.G.S.

5350. The skull of a female Papuan, from Darnley Island, Torres' Straits.

The last molar has not come into place. This skull has been stained of a reddish colour: the orbits and some other depressions have been filled up with a kind of earth, and some

plaited and ornamented grass has been fastened to the jaws, by which apparently the skull has been suspended.

Presented by J. B. Jukes, Esq., F.G.S.

5351. The mummified head of a Papuan, from Darnley Island, Torres' Straits.

The dried integuments of the face have been painted red, and artificial eyes, made of the nacreous lining of some shell, have been inserted. A depressed fracture on the left parietal bone has been filled up by a plate of some hard foreign substance. The cranium is long and narrow, with a forehead sloping and contracted, but with the parietal protuberances well marked. The molars show the large size characteristic of the Papuan variety.

Presented by J. B. Jukes, Esq., F.G.S.

5352. The cranium of a Papuan, native of Wallis Island, Endeavour Straits.

By its small and narrow proportions, the low retreating forehead, the slightly produced nasals, and much produced maxillæ, this skull belongs to the Melanian variety; but the molar teeth, though large, are relatively smaller than in the Australians. The malar bones are moderately prominent. The alisphenoid joins the parietal on both sides of the head. The eustachian processes are well marked.

Presented by J. B. Jukes, Esq., F.G.S.

5353. The cranium of a Papuan, native of New Guinea.

The glabellar prominence is more marked in this than in the preceding skull, but is less produced, and the nasals are less sunk, than in the typical Australian, to which, however, the cranium adheres in its general shape, and the jaws in their anterior prominence. The large proportional size of the molars and premolars, especially in the two last molars, is not manifested in this skull, and the canines are less advanced. The form and relative size, therefore, of the bony palate approach nearer that of the African Negro. A wormian bone intervenes on each side between the alisphenoid and parietal.

5354. The cranium of a female Papuan, native of New Guinea.

A wormian ossicle is interposed between the alisphenoid and parietal on both sides of the head. The cranium is narrow, very slightly expanded at the parietal protuberances. The glabella is very slightly prominent: the nasals are narrow and almost flat: the maxillæ are produced. The last molar is still concealed; the first and second molars have been moderately worn.

Presented by J. B. Jukes, Esq., F.G.S.

5355. The mummified skull of a Papuan, native of New Guinea.

It is of a young individual in whom the last molar tooth had not come into place in either jaw, and the cranium is smaller than that of a European youth with the same dentition. The frontal region is remarkably low and contracted: some decussating lines have been cut upon it: the frontal suture is obliterated: the squamosal joins the frontal on the right side. The

bones of the cranium have been artificially stained; those of the face much mutilated by the rude and singular ornamental processes to which it has been subject. The cavities of the face have been filled and the facial bones plastered over with a kind of ochreous marl, in which numerous seeds with a whitish pearly surface have been stuck: a piece of wood terminated by the valve of a large reddish seed has been inserted into each orbit: a long, flat, widely perforated piece of wood is wedged in the nostril, from the base of which a longer appendage of twisted vegetable fibre depends, in front of the mouth and chin, like a plaited beard, probably indicative of the sex.

This singular specimen was discovered by an exploring party from H.M.S. Fly, in a large deserted native hut, on the banks of one of the rivers of New Guinea, suspended by the quasi beard from a frame under the middle of the roof.

Presented by Captain Blackwood, R.N.

5356. A similar specimen, found under the same circumstances.

Presented by Captain Blackwood, R.N.

5357. The skeleton of an adult male Boschisman, from the Cape of Good Hope.

From the obliteration of most of the alveoli this skeleton appears to have belonged to an aged individual.

The total height from the vertex to the sole is four feet five inches: the length of the vertebral column from the atlas to the sacrum, following the anterior curves, is one foot seven inches: the length of the sacrum is three inches nine lines: the breadth of the sacrum is three inches four lines. The cranium is flatter at the vertex and relatively broader at the parietal protuberances than in the Australian race, and the forehead, though low and narrow, is more prominent. A larger proportion of the alisphenoid joins the parietal. The border of the orbit is thick and prominent, but the superorbital ridge is not carried so strongly across the glabella, and the origin of the nasals is less sunk, than in the Australian race: the nasals are narrower and flatter and the malar protuberances are more regularly convex and prominent. The prognathic character of the jaws is affected by the absorption of the alveoli due to age. The costal portions of the transverse process of the sixth cervical are more developed: the spines of all the cervicals below the axis are simple; those of the third, fourth and fifth are short and of equal length. The right clavicle is more curved upwards and less expanded at its distal end than usual. The superior angle of the scapula is rounded off, and the supraspinal fossa is narrower behind. The diapophyses are backwardly produced in the tenth and the eleventh dorsals. The metapophyses are strongly developed in the twelfth. The anterior ridge of the tibia is bowed forwards.

Presented by Henry Bickersteth, Esq., Surgeon to the Somerset Hospital, Cape Town.

5358. The skull of a female Boschisman, from the Cape of Good Hope.

It agrees in general shape with that of the skeleton, No. 5357, but the glabella and superorbital ridges are much less prominent. The flattened nasals are continued from the same

vertical line as the glabella. The alisphenoid joins the parietal on each side of the head. The molars are of moderate size; the last has not come into place.

Presented by Henry Bickersteth, Esq.

5359. The cranium of a Hottentot.

In the contracted but almost vertical forehead, continued, with a very slight prominence of the glabella, to the narrow flattened nasals, and in the general shape of the cranium, this closely resembles the skull of the Boschisman, No. 5357. The malar bones are equally prominent, and the facial parts of the maxillaries are similarly depressed, but the superorbital ridges are less thickened and less produced. The alisphenoid joins the parietal on both sides of the head. The molars are small. The upper border of the squamosals is on a level with the fronto-malar suture. The superoccipital region rises immediately from the hinder margin of the foramen magnum.

Purchased.

5360. The cranium of a male Caffre.

The man was slain by a musket-ball which has penetrated the glabella.

The cranium is long, moderately broad, but with the frontal region low and sloping at the sides. The squamosal joins the frontal on both sides. The glabella is slightly prominent. The nasal bones are broad and flat. The malars are small, but prominent, and the zygomata large and strong. The supramastoid ridges are well marked. The upper jaw is much produced, and the molars are of moderate size.

Presented by Benjamin Travers, jun., Esq., F.R.C.S.

5361. The skull of a Caffre.

The frontal region is narrow and sloping; the parietal prominences are well developed, and the squamosal region is protuberant. The alisphenoid joins the parietal on both sides of the head. The broad and slightly prominent nasals are continued from the same vertical line as the glabella. The jaws are unusually prominent. The posterior molars are much decayed.

Mus. South.

5362. The cranium of an African Negro.

It differs from Nos. 5360 & 5361 in being more depressed above, broader at the parietal protuberances, and shorter. A small portion of the left alisphenoid joins the parietal; a large wormian bone is interposed on the right side. The glabella is very slightly prominent. The nasal bones are unusually narrow. The maxilla is produced, and the molars are rather large. The basioccipital and basisphenoid are unusually broad and flat. The paroccipital tubercles are well marked. The superoccipital region forms a less obtuse angle with the plane of the foramen magnum than in the other Negro skulls, which for the most part differ in this respect from the White races.

Hunterian.

5363. The skull of a male African Negro.

A larger proportion of the alisphenoid joins the parietal than is commonly seen in the Australian skulls. The frontal prominences and glabella project, but do not form a continuous thick produced ridge, as in the Australian race. The frontal part of the cranium is narrow. The jaws are produced. The molar teeth are large. The paroccipitals are well developed.

Presented by Henry Cline, Esq.

5364. The skull of a male Negro, from the Gold Coast, Africa.

The cranium is large and expanded at the parietal protuberances, though narrow at the forehead. The nasal bones are broad and flat, but are continued from the same vertical line as the glabella. The alisphenoids articulate largely with the parietals. The traces of the maxillo-premaxillary suture may be followed to near the interspace between the outer incisors and canines. The jaws are produced. The molars are not larger than in the White races.

Hunterian.

5365. The cranium of a Negress, eighteen years of age, born in the island of Jamaica.

The last molar is in place: the sagittal suture is obliterated, and the stylohyals are anchylosed. The eustachian processes are well developed. This skull presents the shorter and broader type of the African crania. The slightly prominent nasals are continued from the same line with the glabella. The alisphenoid articulates with the parietal on both sides of the head. The maxilla is very prominent, and the suborbital depressions strongly marked. The calvarium has been detached, showing that the walls of the cranium are of moderate thickness, with the usual development of diploë.

Presented by Sir Robert Schomburgk.

5366. The cranium of a male African Negro slave, who died an idiot in the Hospital at Demerara.

The skull presents the same general shape as that of the Negro from the Gold Coast (No. 5364), being broad at the parietal regions, and with the sides less sloping from the middle or sagittal line; but the superorbital ridges and glabellæ are almost as prominent as in the Australian skulls. The upper jaw, also, is as much produced and the bony palate is as long and as broad as in most Australian skulls, but the molar teeth present a marked inferiority of size. The alisphenoid joins the parietal on both sides of the head. The superoccipital region is concave between the occipital spine and the foramen magnum, and this concavity is bounded by two lateral ridges which are unusually developed. The paroccipital tubercles are well marked and the mastoids unusually large and rugged. The calvarium has been removed, showing the characteristic thickness of the cranial parietes. The posterior and anterior clinoid processes are united, forming a bony bridge over each side of the deep sella turcica. The frontal sinuses rise high above the orbit on the right side.

Presented by Sir Robert Schomburgk.

5367. The skull of a female African Negro slave, who died an idiot in the Hospital at Demerara.

The parietal protuberances and the superorbital and glabellar ridges are much less developed in this skull. The flattened nasals are continued from the same plane with the glabella. There is a wormian ossicle, apparently a dismemberment of the parietal, at the junction of that bone with the alisphenoids. The paroccipital tubercles are well marked.

Presented by Sir Robert Schomburgk.

5368. The cranium of a Negro, from Mujamb's Bay, Madagascar.

The flattened nasals are continued almost from the vertical line of the glabella. The alisphenoid joins the parietals on both sides of the head. The angle between the anterior and upper part of the frontal is well marked. The cranium is oval and expanded at the parietal protuberances. The maxilla is prominent: the bony palate long and broad: the molars are moderately large.

Presented by Captain Sir E. Belcher, R.N.

5369. The skull of a male African Negro, from which part of the basis cranii and the right zygoma have been broken away.

The cranium is short and expanded at the parietal protuberances. The nasals are more narrow and less flat than in No. 5368. The maxillaries are produced in the same degree, although the last true molars are not in place. Traces of the maxillo-premaxillary suture are retained on the palate. A wormian ossicle intervenes between the alisphenoid and parietal on each side.

Hunterian.

5370. The cranium, vertically and longitudinally bisected, of an African Negro.

It shows the characteristic thickness of the cranial parietes and the small capacity of the cranium as compared with that in civilized and educated White races. The apex of the alisphenoid joins the parietal on each side of the head. The glabella and superorbital ridge are not prominent. This skull belongs to the broader and shorter type.

Hunterian.

5371. The base of the cranium of a male African Negro of large stature.

It has the characteristics of the moderately elevated nasal bones and prognathic upper jaw, the alveolar border of which is of great extent and circumscribes a large semicircular bony palate: the prominence of the sockets of the canines imparts a bestial character to the physiognomy of this cranium.

Mus. Langstaff.

5372. The skeleton of a male African Negro.

The bones are less slender, in proportion, than those of the Polynesian (No. 5386). The cranium is narrow and the jaws prognathic; but the forehead recedes less and the nasal

bones are flatter than in the Polynesian. The saerum is narrower, the iliae bones less expanded, and the hands and feet are relatively smaller, than in the European skeleton, No. 5569.

Purchased.

5373. The cranium of a Negro from the Mozambique.

It is remarkable for its extreme narrowness in proportion to its length. The parietals slope away from the obliterated sagittal suture. The squamosal unites with the frontal on each side of the head. The glabella is moderately prominent. The nasals are long, broad, and slightly convex. The molar teeth are small.

Purchased.

5374. The cranium of an African Negro.

It is rather less compressed than the preeeding, but with the parietal prominenees as little marked. The broad and almost flat nasals are continued from the same vertieal line as the glabella. The alisphenoid joins the parietal on both sides. The paroceipital tubercles are well marked.

Purchased.

5375. The cranium of a South African Negro, or Hottentot, of the Baguani tribe.

It presents the narrow elongated type, but is slightly and unsymmetrically expanded at the parietal protuberanees. The apices of the alisphenoids join the parietals. The super-oeeipital ascends immediately from the hinder border of the foramen magnum.

Purchased.

5376. The cranium of a male African Negro.

The superorbital ridge is produeed, and the origin of the nasals sunk : the bones are short, broad, and quite flat. The prognathic eharacter of the jaws is well marked. Only the apex of the alisphenoid joins the parietal. The cranium is narrow, but is flatter above, and the forehead more prominent than in the Australian race. The paroccipital processes are well developed. The suborbital fossæ are unusually deep.

Purchased.

5377. The cranium of an African Negro.

The nasal bones are small, and almost flat and sunk beneath the overarching glabella as in No. 5376. The cranium is low, subelongate, with slightly prominent parietal protuberances. The malars are large and inclined outwards. The upper jaw is produced and broad. The paroccipitals are distinct: the basioecipital is broad and flat.

This skull differs from the Australian type in the smaller molar teeth, and the less sloping sides of the calvarium.

Presented by Sir William Blizard, F.R.S.

5378. The cranium of a Negro, from Ashantee.

The glabella is produced above the origin of the narrow, slightly elevated nasals. The squamosal joins the frontal on each side of the head. The cranium is narrow, slightly expanded at the parietal protuberances. The malar bones small, but prominent. The molars of moderate size, showing degrees of attrition corresponding with the order of their development. The vaginal is continued into the eustachian ridge, which it joins at a right angle.

*Presented by Robert Morrison, Esq., Surgeon, R.N.**

5379. The skull of a male African Negro.

The left median incisor has been removed, and its socket obliterated: the first true molar on each side of the lower jaw has been similarly lost during life. The two extremities of the coronal suture are obliterated. The eustachian process is well developed. The cranium is narrow, and the jaws prominent; but the superorbital ridge is not produced as in the Australian, and the nasal bones, though not very prominent, are longer. The molars are large.

Hunterian.

5380. The skull of an African Negress.

The last true molar is still concealed in the formative alveolus in both jaws. This repeats the characters of No. 5379, with a diminution of size, a proportionally smaller cranium, smaller and less prominent malars, and with the mastoid processes and occipital ridges more feebly developed.

Hunterian.

5381. The cranium of an African Negro.

It presents the narrow elongated form, with a slight development of the parietal tuberosities. The glabella is prominent, and the origin of the short nasal is sunk. The alisphenoid joins the parietal on both sides. The suborbital fossæ are well marked.

Hunterian.

5382. The cranium of an African Negress, presenting the narrow elongate type.

The flattened nasals are continued from the same line with the glabella. The alisphenoid joins the parietal on both sides of the head. The eustachian processes are well marked.

Purchased.

5383. The cranium of a Melanian, and probably African.

It belongs to the long and narrow type, with an unusually low and receding forehead. The glabella is moderately prominent, but not the supraciliary ridges. The left alisphenoid joins the parietal; a wormian bone is interposed on the right side. The paroccipital tubercles are well marked: the maxilla is prominent: the molars are small.

Hunterian.

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* This gentleman accompanied Captain Clapperton in his expedition to Timbuctoo, in 1825, and, with him, fell a victim to the climate and fatigues of the journey.

5384. The left moiety of a vertically bisected cranium of a male African Negro.

The cranial walls are characteristically thick, and show the small amount of diploë in the parietal, as compared with the frontal and the thick superoccipital bones.

Purchased.

5385. The left moiety of a vertically bisected cranium of a female African Negro.

It corresponds in character with the preceding, making allowance for the sexual inferiority of size. A trace of the premaxillary suture extends from the palate through the incisive foramen and along a considerable part of the inner surface of the nostril.

Hunterian.

The Melanian skulls of the African races above described, are divisible into two groups or types, according to the form of the cranium. In the one it is narrow in proportion to its length, with the parietal protuberances slightly or not at all prominent, and the sides sloping quickly from the sagittal region ; but the upper contour differs from that of the Australian in the angle formed at the junction of the more vertical part of the frontal with the upper surface of the cranium.

In the other group the cranium is broader in proportion to its length, the parietal protuberances are well marked, and the sides slope away less rapidly or obliquely from the sagittal region. The narrow forehead commonly presents the same verticality in both types.

To the first of these divisions, or narrow type, belong Nos. 5372—5383, of which one is certified to be from Ashantee, a second from the Mozambique, and a third from a South African tribe called 'Baguani.'

The remainder are referable to the round type, and include the skulls of the Boschismen, the Hottentot, the Caffres, that certified to be from the Gold Coast, that from Madagascar, and those of the Negro slaves, which most resemble in form the skull from the Gold Coast.

It is to be observed that the Caffre skulls differ from those of the Hottentots and Boschismen in their larger size, the greater capacity of the cranium, and the greater strength of the bones of the face.

Xanthian (yellow, olive and red) varieties.

Polynesian Race.

5386. The skeleton of a male Polynesian, native of Tahiti.

It measures five feet four inches from the vertex to the sole. The forehead is narrow and sloping: the parietal protuberances are moderately developed and the cranium is of moderate length, and is narrower and flatter at the sides than in the White races generally. The nasal bones are prominent. The jaws are much produced. The costal part of the sixth cervical vertebra is much produced. The metapophyses are well developed and project midway between the diapophyses and prozygapophyses on the eleventh dorsal: they pass upon those zygapophyses in the twelfth dorsal, in which there is a rudimental anapophysis as well as diapophysis. The anapophysis subsides to a ridge in the first lumbar vertebra, whilst the

diapophysis suddenly increases in length and thickness. The diapophyses of the fourth lumbar incline forward: those of the fifth are much increased in breadth. The space between the anterior superior and anterior inferior spinous processes of the ilium is shorter and more concave than in the European skeleton, No. 5569. The bones of the foot are better developed, and, independently of artificial articulation, the toes are more parallel and are slightly divergent, instead of converging toward their extremities; the phalanges of the toes are also longer, especially the middle and distal ones of the fifth or little toe: these characters relate to the absence of artificial confinement of the foot by a shoe, and this skeleton yields a more natural view of the osteological structure of the human foot than can generally be gained from those of Europeans. The most remarkable individual varieties observable in the present skeleton are the bifurcation of the sternal extremity of the third rib of the left side; but the cartilages continued from the divisions converge and unite to form a single articulation with the sternum, at the usual place, between its second and third part. Each humerus is perforated above the ulnar trochlea. The crest of the left ilium is partially thickened and absorbed. The individual died of extensive disease of the lungs; their structure was almost entirely destroyed by tubercles, many of which were in a state of suppuration.

The body was obtained for the purpose of preserving the skeleton, and the very beautiful examples of tattooed cutis it afforded; of which there are three specimens (Nos. 1864, C, D & E), preserved in the Gallery of the Museum.

Presented by Sir William Blizard, F.R.S.

5387. The skull of a Polynesian, native of the Sandwich Islands.

The forehead is narrow and sloping, but the cranium is large and expanded at the parietal protuberances. The glabella and supraciliary ridges are prominent. The malars are large and moderately prominent. The upper jaw is produced. There is a strong supramastoid ridge on the left side, and a second ridge at the posterior inferior angle of the parietal, which is strongly developed on the right side. The occipital spine is unusually protuberant and rugged.

Purchased.

5388. The skull of a male, native of the Fejee Islands.

The forehead, though narrow, is more elevated in this than in the preceding skull, with which it otherwise agrees in general shape and size. The glabella is much less prominent and the superorbital boundary is thin and neatly defined.

In a letter from Mr. George Bennett, F.L.S., of Sydney, he writes:—"The natives of the Fejee Islands, of New Caledonia, New Hebrides, and the Solomon Islands, appear to be of Papuan origin, but in many of the islands mixed to some extent with their neighbours of Malayan origin." The present skull presents the characters of the Polynesian, rather than those of the Papuan. The individual died of general strumous disease and extensive ulceration of the mucous membranes, in the Hospital at Hobart Town, Tasmania.

Presented by Dr. Hobson.

5389. The skull of a male, native of New Zealand.

The calvarium has been detached.

Presented by Governor Farquhar.

5390. The skull of a male, native of New Zealand.

The permanent dentition is complete and moderately worn. There is a natural interspace between the left canine and the anterior bicuspids, and there are only three inferior incisors, the middle one of which projects on a line with the symphysis, without any trace of the obliterated socket of the missing tooth. The upper half of the superoccipital has been developed as an interparietal from a separate centre, and has united by a complex dentated suture with the lower half of the superoccipital.

Presented by Thomas Hobbs Scott, Esq.

5391. The skull of a male native of New Zealand, with a mutilated basis cranii, and an incised fracture over the sagittal suture.

Presented by Thomas Hobbs Scott, Esq.

5392. The skull of a male native of New Zealand, with a mutilated basis cranii.

Presented by Admiral Sir Thomas Beresford.

5393. The skull of a male native of New Zealand, with a mutilated basis cranii.

Presented by Mrs. Maria Graham.

5394. The skull of a male native of New Zealand, with a mutilated basis cranii and the teeth worn down nearly to the stumps.

A jad-stone ornament is attached to the left zygomatic arch.

Presented by Robert Keate, Esq.

5395. A much mutilated skull of a male, native of New Zealand. *Hunterian.*

5396. A mutilated and much fractured skull of a male, native of New Zealand.

In this specimen a dislocation of the lower jaw has taken place, on the left side, by which the condyloid process has been dislodged from the glenoid cavity, and slipping forwards, has formed a new joint on the eminentia articularis. That this displacement has been permanent, appears, from the adaptation of the bony surfaces to each other, and from the undue wearing of the teeth on that side of the jaw.

Hunterian.

5397. The skull of a female, native of New Zealand, with the basis cranii mutilated.

It differs from those of the males in the smaller cranium and more protuberant superoccipital, in the less prominent superorbital ridges and malars, which latter bones are smoothly rounded. Traces of the maxillo-premaxillary sutures remain on the palate.

Hunterian.

5398. The skull of a female, native of New Zealand.

The glabella is prominent, the jaws slightly produced; but the general characters of the skull correspond, save the usual female modifications, with those of the males. The right paroccipital is well developed, and probably in relation to a distorted position of the head upon the neck, for the right occipital condyle is much shorter and broader than the left. As compared with the skull of a female Australian, there may be discerned, with a slight superiority in the capacity of the cranium, the more constant characteristics of the Polynesian race, in the greater extent of the alisphenoid which joins the parietal, the minor breadth of the basioccipital, the smaller size of the teeth, especially the molars, the smaller bony palate, the more prominent nasals, and the larger lower jaw, with its more prominent or produced inferior border.

In all the above male skulls of the Natives of New Zealand, the cranium presents the ovate form, with the parietal prominences well developed, the sides sloping away moderately from the sagittal line: the forehead is narrow, sloping in most, and the upper jaw is moderately produced in most. The malars are moderately prominent: the nasals are prominent and large in most: the lower jaw is large and with a well-developed chin in all: the molar teeth are in a marked degree less than in the Australian natives.

Presented by the Hon. William Martin, Chief Justice of New Zealand.

5399. The skull of a male native of Lefoo, the largest of the Loyalty Islands, near New Caledonia.

In general size and configuration it corresponds with the New Zealand skulls. The squamosals rise to above the level of the orbits. The glabella is slightly prominent, and the large well-developed nasals are continued from nearly the same vertical line with it. The forehead is narrow and sloping. The jaws very slightly prominent. The thickened posterior border of each parietal is developed so as to overlap, as it were, part of the lambdoidal suture.

In a letter accompanying this specimen the Donor remarks, that "the Lefoo natives whom I have seen alive in Sydney appear to be a mixed race of the Papuan and Malayan."

Presented by George Bennett, Esq., F.L.S.

5400. The skull of a female native of Lefoo Island.

Presented by George Bennett, Esq., F.L.S.

5401. The skull of a child, native of Lefoo Island, which has acquired the permanent incisors and first true molars. *Presented by George Bennett, Esq., F.L.S.*

5402. The skull of a younger child, native of Lefoo Island, with only the deciduous teeth.

The basioccipital has been removed.

Presented by George Bennett, Esq., F.L.S.

American Races.

5403. The skull of a male Carib, from the Caribbean Islands.

The cranium presents the ovate figure, with the parietal protuberances well developed, and is chiefly characterized by the slope or recession of the forehead from above the glabella and superorbital ridges. The nasals are large and prominent: the upper jaw is produced; the lower one is large, with a prominent chin.

Hunterian.

5404. The cranium of a Carib, from the Caribbean Islands.

It shows the same low and receding forehead, but with a broader and more generally depressed cranium, protuberant at the squamosal regions. The nasal bones are large and prominent, and are continued in a line with the glabella. The upper jaw is produced.

Hunterian.

5405. The skull of a Macusi Carib or Indian, from Guiana.

The head is well developed and symmetrically formed, narrow at the forehead, expanded at the parietal bosses, with the broad and rather low nasals coming off in a line with the glabella; the upper jaw is produced. The paroccipital tubercles are distinct, the vaginal processes long and narrow.

Purchased.

5406. The cranium of a female Carib or Indian of the Arawaak tribe, from Guiana. *Purchased.*

5407. The skull of a native of the tribe of Indians inhabiting the banks of the Columbia River, called 'Flat-heads.'

The cranium has been deformed by the application of flattened boards to the frontal and superoccipital regions, occasioning the singularly depressed, broad or bulging subelongate figure which this skull presents. The large and almost flattened nasals are continued forwards in a line with the glabella. The upper jaw is produced, and the chin is moderately prominent.

Mus. Sir A. P. Cooper, Bart.

5408. The skull of a Flat-head Indian, from Coffin Island, Columbia River.

The styliform process of the sphenoid has become confluent with the ectopterygoid on the right side; it is unusually prominent on the left. The glabella and nasal bones are in the same oblique line.

Presented by Capt. Sir Edward Belcher, R.N.

5409. The cranium of a Flat-head Indian from the same locality.

From the unusual bulging on the left side, it is probable that some amount of hydrocephalus was produced during the process of compression. Traces of the premaxillary sutures are distinct and extensive on the palate.

Purchased.

5410. The cranium of a Flat-head Indian from the Columbia River.

The frontal sinuses and glabella are more prominent than in the foregoing specimens: the suture dividing the frontal has been retained. The calvarium has been detached: the cranial parietes at the line of section do not exceed the ordinary thickness.

Purchased.

5411. The cranium, vertically and longitudinally bisected, of a Flat-head Indian, from the Columbia River.

In the prominence of the glabella it resembles No. 5410, but the frontal suture is obliterated, and the parts of the coronal suture below the temporal ridges. In the line of section, the cranial parietes are thinnest at the middle of the flattened frontal, where the diploë is obliterated: the rest of the parietes are thicker than usual. The supramastoid and occipital ridges are well developed. The paroccipital tubercles are distinct. The increased capacity of the hinder part of the cranium compensates for the diminished height of the fore part.

Mus. Ves. Pettigrew.

5412. The skull of a female infant of the Flat-head Indian race, from the Columbia River.

The deciduous incisors have cut the gum: not the deciduous canines or molars. The elements of the occipital are ununited. The superoccipital is expanded, almost flattened, and pushed unsymmetrically to the left side, by the pressure of the lower flattening-board, which has also flattened the lower part of the right parietal: the effect of the upper flattening-board is more remarkably shown upon the frontals and contiguous parts of the parietals: the sutures are linear and the great fontanelle is widely open: the compressed brain has pushed forwards the orbital plates of the sphenoids and frontals, and must have caused the eye-balls to protrude frightfully: the lower border of the orbits is much advanced beyond the upper one. The alisphenoids join the parietals on both sides of the head. The maxillo-premaxillary suture remains on the palate and in part of the nasal cavity. The nasals, malars, and right exoccipital are wanting in this skull.

Mus. Ves. Pettigrew.

5413. The skull of a male Indian of the Chenook tribe, inhabiting the banks of the Columbia River at its outlet into the Pacific.

The forehead here recedes as in the Carib, and the cranium has been constricted and elongated by artificial treatment, apparently like that which was practised by the ancient inhabitants of Peru. This skull is remarkable for its large size. The transverse and median occipital cristæ are strongly developed. The nasal bones are prominent. Both the upper jaw and the chin are produced.

Presented by Frederic Tyrrell, Esq.

5414. The skull of an ancient Peruvian from the Mausoleum at Patacamaya (the 100 dead), near Belen, Bolivia.

This differs from the preceding skull in the more sudden slope and minor convexity of the frontal, but resembles it in the annular constriction of the cranium behind the coronal suture; the flattening, constriction, and elongation of the cranium having been produced by ligature at that part during infancy. The nasal bones are large, moderately prominent, and continued forwards from the same sloping line with the glabella. The lower jaw is much produced, but the chin is well developed. Notwithstanding the deformity and the low character imparted artificially to this skull, the cranial cavity is as capacious as in other American races. The brain was as large, but was differently placed. The transverse line equally bisecting the lower surface of the skull here crosses the middle of the foramen magnum.

Presented by J. B. Pentland, Esq.

5415. A similarly modified skull of an ancient Peruvian, from Titicaca.

The forehead is somewhat more convex than in the preceding skull, but the cranium presents the same evidence of artificial constriction behind the coronal suture.

Presented by Lord Dudley.

5416. A cranium of an old male Peruvian, from Titicaca.

Presented by Lord Dudley.

5417. The cranium, vertically and longitudinally bisected, of an old male, from Titicaca.

The paroccipitals are distinct, and the process is remarkably developed on the right side, where it almost equals the mastoid. The cranial parietes are moderately thick. There is little or no depression at the root of the nose in this or the two preceding skulls, which were taken from an ancient burial-place in the Island of Titicaca, situated in the middle of the Lake of Chucuito, in a province of Peru of that name. The Island of Titicaca is celebrated as having been the residence of Manco Copac, the founder of the Peruvian nation.

Presented by Lord Dudley.

5418. The skull of an ancient Peruvian, with much of the dried integument, showing the effects of the circular constriction of the cranium, as in the preceding skulls. *Purchased.*

5419. The cranium of a female ancient Peruvian, from Titicaca.

Presented by Captain Tucker, R.N.

5420. The skull of an infant of the same race of ancient Peruvians, which has perished whilst undergoing the constriction of the cranium, applied to produce the desired modification of form.

The process has already had considerable effect upon the yielding bones at this age, and seems to have been attended with a separation of the upper or interparietal half of the rest of the superoccipital. The elements of the occipital bone are still ununited, as are the two halves of the frontal bone. The great fontanelle is widely open, and the lower part of the meatus auditorius is unossified. The mark of the constricting bandage is very obvious on the under and lateral parts of the much-elongated cranium.

Purchased.

5421. A considerable proportion of the skeleton of the same child. *Purchased.*

5422. The cranium of a Peruvian of the modern or Inca race.

It is short, broad, and high, especially behind, owing to the habit of carrying the infant with the back of the head resting upon a flat board: the pressure having been more towards the left side, has produced a slight unsymmetrical distortion of the skull. The forehead is narrow and receding. The glabella slightly prominent.

Presented by Alexander Nasmyth, Esq.

5423. The cranium of a Peruvian of the Inca race.

It presents a similar shape, but the pressure of the resting-board having been more to the right side, has produced an unsymmetrical distortion of an opposite kind to that in the preceding skull. The condition of these differences has probably been the different breasts at which the respective infants were habitually suckled.

Presented by Alexander Nasmyth, Esq.

5424. A cranium of a Peruvian found buried in a sandy soil impregnated with nitre, at Thuacho, fifty miles from Lima.

It is of a distorted, or unsymmetrical shape, the right hemispheres, both of cerebrum and cerebellum, being more posteriorly situated than the left. The teeth are very regularly worn down, and well exhibit the thickness of the enamel coating.

Presented by Hugh Cuming, Esq.

5425. The skull of a modern Peruvian child from the valley of Copyapo, thirty-three leagues from the coast.

This child has been the subject of chronic hydrocephalus, whereby the cranium has become unusually expanded. The expanded back part of the cranium shows the flattening produced by the resting-board. The alisphenoids ascend to a level with the upper borders of the orbits. The vaginal processes are unusually distinct and prominent. The premaxillary sutures remain upon the palate.

Purchased.

5426. The skull of a male Patagonian.

It agrees in general shape with that of the modern Peruvians, Nos. 5422 and 5423, the occiput presenting the same height, breadth, and slight unsymmetrical flattening, but it is distinguished by its superior size, obviously belonging to a larger race of men. The frontal sinuses are well developed. The nasal bones are narrow, but prominent. The malars are large and prominent. The upper jaw is moderately produced.

Presented by Capt. Fitzroy, R.N.

5427. The cranium of a female Patagonian.

It has the same general form and large proportional size, but with smaller and more neatly-defined facial bones. The forehead is narrower, lower, and more receding than in the male; the broad quadrate occipital region is flatter, and bent more abruptly from the superior, almost flattened, parietal region. The vaginal processes are unusually produced. The glabella is prominent: the nasals are long and unusually prominent. The malars are smaller and less prominent than in the male. The upper jaw is moderately produced. This and the preceding skulls were taken from under a heap of stones on the east coast of Patagonia, near Port Melo.

Presented by Capt. Fitzroy, R.N.

The following, to No. 5440 inclusive, are parts of the same skeleton of a Native of Terra del Fuego:—

Presented by Capt. Fitzroy, R.N.

5428. The skull.

The cranium is subelongate, moderately expanded at the parietal bosses, with a narrow and protuberant superoccipital: the forehead is narrow and low. The glabella is prominent, and the nasals are produced. The malars are moderately prominent; the jaws prognathic; the chin well developed. The base of the skull presents paroccipital protuberances, large styliform processes of the sphenoid, and small but distinct eustachian processes of the petrosal. Traces of the maxillo-premaxillary suture remain on the palate. The molar teeth are of moderate size, and are worn on the inner border in the upper jaw and on the outer border in the lower jaw.

5429. The atlas.

5430. The axis.

The vertebral artery forms a depression behind the anterior zygapophysis before it escapes outwards anterior to the diapophysis. The sides of the low broad spine are considerably but unequally produced backwards.

5431. The three following cervical vertebræ.

They have low, broad, sub-bifurcate spines: the arterial canal is larger on the left than on the right side.

5432. The left scapula.

The margin of the spine is thicker at its base than in the Australian, No. 5222, and becomes much thinner between that part and the acromion. The glenoid is broader in proportion to its length than in the Esquimaux, No. 5465.

5433. The right clavicle.

It is thicker and more expanded at its scapular end than in the Australian, No. 5219, and closely resembles that of the Esquimaux, No. 5464.

5434. The left humerus.

The shaft is much thicker, in proportion to its length, than in the Australian, No. 5223, and closely resembles that of the Esquimaux, No. 5466, being also thicker in proportion to its length than in the European, and showing a greater development of the deltoid ridge.

5435. The left radius.

5436. The left ulna.

5437. The left os innominatum.

It is larger than in the Australian, and the ischiatic notch is narrower: its upper angle is rounded off. The obturator foramen is smaller than in the Australian and larger than in the European.

5438. The left femur.

This differs from the femur of the Australian, No. 5260, in the great increase in its thickness in proportion to its length, in the less obtuse angle which the neck makes with the shaft, and from that of the European, in the greater degree of anterior curvature, the greater development of the linea aspera, and the greater prominence of the small trochanter.

5439. The left tibia.

It is thicker in proportion to its length than in the Australian, No. 5261, and is more compressed and less flattened posteriorly than in the European.

5440. The left fibula.

5441. The cranial portion of a skull, with part of the dried integuments, which was found in a saltpetre cave in the Tennessee State, North America.

It is moderately long and broad at the parietal protuberances, with a low forehead receding from the glabella, which is moderately prominent, but with the nasal bones continued from it without an intervening depression. The malar bone, which is preserved on the left side, is larger and more prominent than in the South American Indian (No. 5405). From the edentulous character of the part of the upper jaw preserved, this appears to have been the skull of an aged individual, and from its size and the development of the mastoids and of the supramastoids and occipital ridges, to have belonged to a male. The coronal suture is partially obliterated.

Purchased.

Dr. Pritchard, in his general observations on the shape of the head among the South American Aborigines, states that "no constant observation can be laid down: the form of the cranium varies in every tribe. The Peruvians have most generally heads of an oblong form, somewhat compressed laterally, the forehead a little prominent, short, and falling somewhat backward. In the people of the Pampas the head is generally rounded, nearly ellipsoid, contracted in length and but little compressed laterally, with a forehead moderately prominent and not falling back. In the Chiquitos the same character is exaggerated and the head is nearly circular, while in the Moxos it is more oblong: this last form is very nearly that of the Guarani, or Paraguay Indians *." Dr. Pritchard also cites the observation by Dr. Morton, "that the heads of the Caribs, as well of the Antilles as of Terra Firma, are naturally rounded †."

Of the Aborigines of America the actual Collection of the College includes skulls of the ancient (Nos. 5414—5420) and modern (Nos. 5422—5425) races of Peruvians, of Patagonians (Nos. 5426, 5427) and Fuegians (No. 5428), of the Caribs of the Antilles (Nos. 5403, 5404), of the Chenook tribe, Columbia River (No. 5413), of the 'Flat-heads' of the same river (Nos. 5407—5412), and of the Arawaak (No. 5406) and Macusi (No. 5405) Indians, natives of Guiana, which latter belong to the Caribée division of the great Brasilio-guarani group of M. d'Orbigny's Classification of the South Americans.

The tribe which still retains the name of 'Carib' in Guiana has long abandoned the practice of artificially flattening the head, which characterized the Caribs inhabiting the neighbouring Caribbean Islands. The skulls of the individuals of the continental tribes are ovate, viewed from above: the occiput is not flattened as in the Peruvian and Californian Indians, but is moderately prominent,

* History of Man, 8vo, 1843, p. 428.

† *Ibid.* p. 364.

rounded and rather narrow. The forehead is narrow and slopes with a gentle curve directly from the interorbital space, which is more prominent than the supraciliary ridges and has no median vertical impression. The alisphenoid presents a margin of half an inch in length to join the parietal on both sides of the head. The cheek-bones and lower border of the orbit are moderately prominent: the nasal bones are continued with a very slight depression from the glabellar prominence: the superior maxillary bones are produced: the lower border of the malar process of the maxillary bone is slightly concave. The lower border of the orbit is a little more concave than the upper one: the spheno-orbital fissure is widely open anteriorly. The cranium of the Macusi Indian (No. 5405) is more oblong and ellipsoid, viewed from above: the forehead is broader, the parietal region narrower, or at least not broader, than it is in the shorter crania of the Carib tribe. The frontal sinuses cause the superorbital ridges to project beyond the interorbital space: the malar bones are equally prominent: the outer angle of the malar processes of the maxillary bones overhangs the concave line leading thence to the alveolar processes. The general character of the facial part of the skull resembles that of the Patagonian Indian, but the prominent convex occiput and general form of the cranium approach nearer to the Carib form.

The Carib, Guianian and Columbian skulls all agree in the roundness or convexity of the occipital region, and differ in this respect, as well as their more symmetrical figure, from the skulls of the Peruvians, Chilians and Patagonians.

All the American skulls manifest the same inferiority in the size of the true molar teeth as compared with the skulls of the Australians: the incisors, canines and premolars, or bicuspides, are not smaller than in the Black races.

The following, to No. 5472 inclusive, are parts of the same skeleton of a male Esquimaux :—

Presented by Captain Sir James C. Ross, C.B., R.N.

5442. The skull.

The cranium is of the long and narrow type, with the parietal protuberances slightly marked. The glabella is not prominent, nor is the supraciliary ridge, which is neatly defined. The malars are large, inclining outwards as they descend: the malar processes of the maxillary are almost plane anteriorly. The nasals are large and prominent: the jaws are much produced: the chin is moderately developed. Traces of the maxillo-premaxillary suture remain on the palate.

This skull differs from those of the Greenlanders (Nos. 5479, 5480), in the smaller size and less prominence of the malars and malar processes of the maxillary, in the minor breadth of the lower jaw, and in the greater development of the prognathic character. The sides of the calvarium slope rather less abruptly from the median elevation than in No. 5479.

5443. The atlas.

It differs from that of the male Australian (No. 5186), in the larger relative size of the zygapophyses.

5444. The axis.

This is larger, has larger zygapophyses, and the under part of the centrum less compressed, than in the Australian. In both the neural spine is broad transversely, with its angles bent back.

5445. The third cervical vertebra.

The posterior zygapophyses are larger, the diapophyses thicker and more produced, and the canal for the vertebral artery wider, than in the Australian.

5446. The fourth cervical vertebra.

The vertical diameter of the centrum is much greater than in the Australian.

5447. The fifth cervical vertebra.

5448. The sixth cervical vertebra.

5449. The seventh cervical vertebra.

5450. The first dorsal vertebra.

It differs chiefly in its longer and stronger proportions from that of the Australian.

5451. The second to the sixth dorsal vertebræ.

The parapophysis (or articular surface for the head of the rib) increases in size and distinctness from the fourth to the sixth. These vertebræ differ chiefly from those of the Australian by the relatively greater size of the centrum and the stronger processes.

5452. The seventh to the tenth dorsal vertebræ.

They differ chiefly in their relatively larger centrum from those of the Australian.

5453. The eleventh dorsal vertebra.

It has a single surface for the head of the rib on each side, which has ascended from the body upon the neurapophysis. The diapophysis is very short and obtuse: a metapophysis of greater length extends from its upper and back part towards the zygapophysis. There is a short anapophysis.

5454. The twelfth dorsal vertebra.

The costal surface has now wholly passed upon the extremity of the short and thick diapophysis: the metapophysis and anapophysis are distinct from this.

As compared with the twelfth dorsal of the Australian, besides a considerable inferiority of size, the costal surface is on the side of the neurapophysis, and has not ascended upon the tubercle which represents the diapophysis, as in No. 5204.

5455. The first lumbar vertebra.

The anapophysis and metapophysis have subsided to tubercles, and the diapophysis is elongated by the extension of ossification into the fibro-cartilaginous basis of the pleurapophysis.

In the Australian the metapophysis is relatively longer, the diapophysis smaller, and the tubercles on the back of the posterior zygapophyses are less developed.

5456. The second lumbar vertebra.

5457. The third lumbar vertebra.

The upper part of the neural arch has been, probably after fracture, moveably articulated with its piers or bases. The anapophyses are well developed.

5458. The fourth lumbar vertebra.

That of the Australian differs in its much shorter diapophyses.

5459. The fifth lumbar vertebra.

The shortened and much thickened diapophyses present an articular surface for the produced angles of the sacrum.

5460. The sacrum.

It is larger and broader in proportion to its length than in the Australian (No. 5210); it is also more concave anteriorly. The neural arch is left open and incomplete in all the vertebræ, whilst in the Australian the neural arch of each of the three anterior sacral vertebræ is completed and supports a spine.

5461. The first pair of thoracic ribs.

5462. The second pair of thoracic ribs.

5463. The last pair of thoracic ribs.

5464. The right clavicle.

It is thicker in proportion to its length than in the Australian, is flatter below, and more expanded at its acromial end.

5465. The left scapula.

The supraspinal portion is longer in proportion to its breadth and is more pointed below than in the Australian. The supraspinal portion of the base inclines more forwards and meets the upper costa at a more acute angle: the upper costa is shorter than in the Australian.

5466. The left humerus.

It is shorter and thicker in proportion, and has a larger and more hemispheric head, than in the Australian (No. 5223).

5467. The left ulna.

5468. The left radius.

The antibrachial bones offer similar differences of proportion, as compared with those of the Australian.

5469. The ossa innominata.

The ischiatic notch is less deep and narrow and the obturator foramen less wide than in the Australian, in which the anterior superior angle of the ilium is more produced.

5470. The left femur.

It is thicker, and stronger in proportion to its length, and the neck is set on at a less obtuse angle with the shaft, than in the Australian (No. 5260).

5471. The left tibia.

It is both shorter and thicker in proportion than in the Australian, and the shaft is less compressed; but the oblique longitudinal ridge at the back part of the proximal third is more strongly developed in the Australian.

5472. The left fibula.

With the same differences of proportion as in the preceding, we may notice here that in the Australian the outer surface of the fibula is more deeply excavated in the longitudinal direction, and the three angles of the bone are sharper and more produced, except at the distal third, where the angular ridge near the tibia subsides.

5473. The skull of a female Esquimaux.

This repeats, with the sexual modifications, the characters of that of the male (No. 5442). The paroccipital tubercles are present, and traces of the maxillo-premaxillary sutures remain on the palate.

Presented by Captain Sir James C. Ross, C.B., R.N.

5474. The cranium of an Esquimaux.

The forehead is narrow and sloping: the cranium is slightly expanded at the parietal and squamosal regions, and is slightly elevated at the sagittal region. The upper jaw is produced. The malars and zygomatic arches have been broken away, but the malar processes of the maxillary are broad and prominent. The glabella is slightly convex; the supraciliary ridges are thin and well defined, but not prominent.

Presented by Captain Sir Edward Parry, C.B., R.N.

5475. The cranium, similarly mutilated, of an Esquimaux.

It presents the same general form of cranium and prognathic jaw, but with smaller nasals and less prominent cheek-bones.

Presented by Captain Sir Edward Parry, C.B., R.N.

5476. The cranial part of a weather-worn and mutilated skull of an Esquimaux.

It is remarkable for its superior length, and the more rapid slope of the sides from the median or sagittal elevated line, as compared with the foregoing.

Presented by Captain Sir Edward Parry, C.B., R.N.

5477. The cranium of a male Esquimaux.

The forehead is rather higher and the upper jaw less produced than in the foregoing specimens. The paroccipital processes have been developed and broken off: the articular cavities for the lower jaw are more shallow than usual. The atlas is anchylosed to the occipital condyles. The state of the dentition indicates the individual to have been aged.

This cranium was taken from a burial-ground at Walstenholme Sound, Greenland, the northernmost inhabited point of the globe.

Presented by Archibald Gilchrist, Esq., Surgeon, R.N.

5478. The left moiety of a vertically and longitudinally bisected cranium of a male Esquimaux.

The basioccipital and basisphenoid are thicker and contain more diploë than in the European: the bony palate is also thicker; but the chief difference is presented by the more produced upper jaw. From the Australian and Negro skulls this differs in the less thickness of the cranial walls.

Presented by Alex. Fisher, Esq., Surgeon, R.N.

5479. The skull of a male Greenlander.

The cranium presents the elongated form, with the sides sloping from a median sagittal eminence. The parietal protuberances are feebly developed. The glabella is not very prominent, scarcely produced above the root of the nose: the superorbital ridge is thin and well defined. The nasals are prominent: the upper jaw is produced, but the chief characteristic of the skull is presented by the large and prominent cheek-bones, the lower border of which terminates a plane extending from the ectorbital process downwards, outwards and forwards. The zygomata are long and strong. The lower jaw is large, with a well-marked chin. The paroccipital ridges are well developed.

Purchased.

5480. The skull of a male Greenlander.

In this the forehead is rather more elevated than in the preceding, and the median elevation and lateral slopes of the cranium are less marked, but the characteristics of the facial bones are closely repeated.

Purchased.

5481. The anterior moiety of a vertically and transversely bisected cranium of a male Greenlander.

The median elevation and lateral slope of the long and narrow cranium are well marked. The malar portions of the maxillaries form a broad, vertical, almost flat wall of bone as they extend outwards to join the very large and prominent malars. The alveolar border of the upper jaw describes almost a true semicircle.

Purchased.

5482. The cranium of a male Greenlander.

The compressed character of the elongated brain-case is somewhat exaggerated in this specimen.

Purchased.

5483. A mutilated and weather-worn cranium of a male Greenlander.

This shows well the characteristic slope of the sides of the long and narrow cranium from the median eminence.

Presented by Alex. Fisher, Esq., Surgeon, R.N.

The foregoing skulls of the Greenlanders manifest in an eminent degree the characteristics ascribed by Blumenbach to his Mongolian family of Mankind; the transition from the North American type being made by the Esquimaux.

Asiatic Races.

5484. The cranium of a native of Tartary.

It is remarkable for its breadth, shortness, slightly convex superior surface, and broad, high, and vertical occipital surface. The forehead is broad, but low. The nasal bones are large and prominent: the malars are not prominent. The anterior alveoli of the upper jaw slope forwards.

Hunterian.

5485. The skull of a male Chinese.

The cranium presents the moderate or medium proportions of length, height and breadth. The sagittal region is not unusually elevated. The plane of the glabella is slightly affected by the frontal sinuses, and the large and prominent nasals are continued therefrom with a very slight depression. The malars are large and slightly prominent. The upper jaw is not produced. The chin is well developed. The paroccipital tubercles are well marked.

The chief distinction which this skull presents from the average form of those of European races is in the size and prominence of the malar bones.

Hunterian.

5486. The skull of a Chinese Pirate.

The prominent malars are here associated with prognathic jaws and a narrower and lower forehead.

Presented by George Bennett, Esq.

5487. The skull of a male Chinese.

This presents a similar character of the forehead and jaws, but with a shorter cranium and a higher and flatter occipital region, resembling that of the Peruvian skulls and probably due to the same cause. The paroccipital protuberances are moderately marked.

It was picked up in a recess amongst the basaltic rocks of Second Bar, Pagoda Hill, Canton River. The skeleton was entire and wrapped in cloth.

Presented by Robert Auld, Esq.

5488. The cranium of a Chinese, from a cemetery at Pekin.

The malar bones are rather large and incline outwards as they descend from the orbits, and the malar processes of the maxillary are broad. The cranium resembles in shape that of No. 5487, but with a somewhat narrower and more uniformly sloping forehead.

Presented by Anthony White, Esq.

5489. The cranium of a Chinese, from a cemetery at Pekin.

It presents a similar shape to the preceding, but with the sides more protuberant at the squamosal regions, and with the upper jaw more produced.

Presented by Anthony White, Esq.

5490. The cranium of a Chinese. *Hunterian.*

5491. The cranium of a Chinese. *Hunterian.*

5492. The skull of a Chinese Ladrone.

The cranium is somewhat narrower in proportion to its length than in the preceding Chinese skulls. The forehead is low, contracted and sloping. The nasals are as flat as in the Negro; they are continued from the same line with the glabella. The upper jaw is produced. The malars are moderately large and prominent. Each squamosal joins the frontal.

Presented by J. Reeves, Esq.

5493. The cranium of a Chinese Ladrone.

It is broader in proportion to its length than the preceding, but with the forehead as narrow, low and sloping. The upper halves of the nasals are broad, flat, and come off in a line with the glabella. The upper jaw is rather prominent. The malar bones are convex and prominent. The alisphenoids join the parietals.

This and the preceding skull both manifest a slight unsymmetrical oblique deformity. They are from individuals executed for murder and piracy at Macao.

Presented by J. Reeves, Esq.

5494. The skull of a Malay Pirate.

It is broad in proportion to its length, with the parietal protuberances well marked, very slightly convex above, with a low and narrow forehead. The nasals are prominent: the malars rather less than in the Chinese. The upper jaw is produced. The fore part of the incisors, canines and first premolar have been filed away and stained black. The right squamosal joins the frontal.

Hunterian.

5495. The cranium of a Bugie Malay.

It shows a similar broad, subdepressed form of cranium, with a narrow and low forehead. The nasals are continued from the same line as the glabella: the malars are broad and prominent: the maxilla is produced.

Purchased.

The following, to No. 5530 inclusive, are parts of the same skeleton of an old male native of Borneo:—

Presented by Captain Sir Edward Belcher, C.B., R.N.

5496. The skull.

The cranium presents the average proportions of length, height and breadth, with the occipital region high, broad, and slightly unsymmetrical, as in the Peruvian skulls, and probably

from the same cause. The forehead is narrow and rather low: the cheek-bones are prominent, but not very large; the nasals large, prominent, and well produced. The chief individual peculiarity of this skull is seen in the unusually long anchylosed stylohyals. It is edentulous, and the sockets of most of the teeth have been absorbed.

5497. The atlas.

Compared with that of the Australian (No. 5186), the zygapophyses are smaller, the diapophyses are larger, and the sub-bifurcate neural spine is better developed. The canals for the vertebral arteries are larger, and they perforate the neural arch as well as the transverse process. The neural arch is likewise perforated by the first spinal nerve. The characters of age are manifested by the irregular ossification extending from the periphery of the odontoid articular surface.

5498. The axis.

The diapophyses here are smaller, the bifid spine longer, and the transverse processes more widely perforated and more produced, than in the Australian (No. 5187).

5499. The third cervical vertebra.

This, also, repeats the differences of the smaller zygapophyses, the larger articular canals, and, the spine being bifid, with the two divisions well produced.

5500. The fourth cervical vertebra.

5501. The fifth cervical vertebra.

The same differences are repeated in both these vertebræ as compared with those of the Australian.

5502. The sixth cervical vertebra.

The body is proportionally larger and the costal part of the transverse process more produced than in the Australian. As an individual peculiarity, the neural arch and spine are slightly distorted towards the right side, and the vertebral arterial canal of the same side is contracted and divided by a transverse bony bar.

5503. The seventh cervical vertebra.

Both transverse processes are perforated. All the foregoing vertebræ to the axis inclusive show characters of age by irregular ossifications extending into the anterior vertebral ligament.

5504. The first dorsal vertebra.

The inequality of size in the zygapophyses is here less. The diapophyses are longer and stand more outwards, and the centrum is larger than in the Australian Negro.

5505. The second dorsal vertebra.

5506. The third and fourth dorsal vertebræ, partially anchylosed.

5507. The fifth dorsal vertebra.

5508. The sixth dorsal vertebra.

In each of the preceding the diapophyses are less bent upwards than in the Australian.

5509. The seventh to the eleventh dorsal vertebræ inclusive, anchylosed together, by a continuous ossified tract, along the right side of the centrum.

The metapophyses are distinctly developed from the upper part of the base of the diapophyses of the eleventh vertebra.

5510. The twelfth dorsal vertebra.

It is larger than in the Australian, has the neural spine more extended in the direction of the axis of the body, has a larger costal surface, and shows the anapophysis more distinct from the rudimental diapophysis.

5511. The first lumbar vertebra.

In this the metapophyses, anapophyses and diapophyses are more produced and distinct than in the Australian. Although the vertebra is larger than in the Australian, the zygapophyses continue to be absolutely as well as relatively less.

5512. The second lumbar vertebra.

Although the anterior zygapophyses in their change of position have ascended to the base of the metapophyses, both these and the anapophyses continue to be distinct from the progressively increasing diapophyses.

5513. The third lumbar vertebra.

Here both metapophyses and anapophyses have subsided to tubercles. The zygapophyses equal those in the Australian, and the diapophyses are of the same length, but the body and neural spine of the vertebra are much larger.

5514. The fourth lumbar vertebra.

This is individually remarkable for the ossific growths which have extended from the under part of its centrum into the ligamentous sheaths underlapping the contiguous vertebra before and behind.

5515. The last lumbar vertebra, showing in a minor degree the same characteristics of age.

5516. The sacrum, with the first coccygeal vertebra anchylosed.

It is relatively broader, especially across the third vertebra, and is less concave than in the Australian. The neural arch is completed over the first four vertebræ.

5517. The sternum, to the manubrium of which the first pair of ribs has been anchylosed.

The manubrium, body and ensiform appendage have coalesced into one bone, from the lower part of which ossification has extended into the cartilages of the fifth, sixth and seventh ribs of the right side and into the fourth and fifth of the left side. The first rib is longer, but is narrower and less curved, and the sternum is both longer and broader than in the Australian.

5518. The second to the twelfth pairs of thoracic ribs.

5519. The left scapula.

It is longer in proportion to its breadth, the upper angle is less produced, and the acromion is broader and flatter than in the Australian (No. 5222).

5520. The left clavicle.

This is longer and more slender than in the Australian.

5521. The left humerus.

This is shorter and more slender than in the Australian.

5522. The left radius.

This is shorter and more slender than in the Australian.

5523. The left ulna.

With the same difference, as the radius, this shows a quadrate, not, as in the Australian, a transversely extended lesser sigmoid cavity.

5524. The left os innominatum.

The ilium is longer and larger in proportion to the acetabulum: the sacro-iliac symphysis is longer in proportion to its breadth, whilst it shows reversed proportions in the Australian. The supracotyloid tuberosity is more developed; and, as a character of age, the present bone shows the completion of the rim of the acetabulum by ossification of the transverse ligament.

5525. The left femur.

This is shorter than in the Australian: the shaft is straight; the neck forms a less open angle with the shaft. As characters of age may be noticed irregular ossifications from the lineæ asperæ, which have extended into the tendons or aponeuroses therein inserted.

5526. The left tibia.

This is of the same length as that in the Australian. The shaft is more compressed.

5527. The left fibula.

5528. The left astragalus.

It differs from the Australian in the absence of any indentation at the back part of the tibial surface, and in the greater extent of the anterior calcaneal surface, which is continued by non-articular bone into the contiguous angle of the posterior surface. The ridge on the inner side of the astragalus of the Australian is not developed in the present bone.

5529. The left calcaneum.

The hinder prominence is longer, and the under surface is broader and flatter than in the Australian: the outer tubercle is grooved by the peroneal tendon.

5530. The remaining five bones of the left tarsus.

The following extract from Mr. Adams's Notes appended to Sir Edward Belcher's 'Voyage of the Samarang,' relates to the above parts of the skeleton of the aged Bornean:—

" In the course of our progress up the river we came to a deserted village, and examined the country around. Our attention being directed to a building on a hill, surmounting the ruined hamlet, we scaled the height, and found it to consist of the tomb of a rajah or other

great man. It was palisadoed round, and covered with a kedjang roof, while, in the interior, over the grave was a faded canopy of silk. In the course of our scrutiny a large and handsome snake was espied among the rafters, and an animated hunt ensued, which ended, however, in the escape of the serpent. In our eagerness to obtain the specimen the shed was unroofed, and, as I was anxious to ascertain the mode of sepulture among the Malays, I obtained permission to disinter the rajah and examine the grave. Some men being placed at my disposal, we proceeded in our unholy work, and at about four feet from the surface, came to a board placed in a diagonal manner across the shaft; on removing which we perceived a square lateral chamber or cavity, where the remains of the deceased 'Orang Kaya' were reposing. The skeleton was that of a very old man, and is now in the Museum of the College of Surgeons. Not a vestige of clothing, not even the wrapper of white cloth which is said to be generally employed, nor any ornaments of any kind, were found in the grave. The body was laid on the right side, with the knees in a bent position, and the flesh was mummified and adhering firmly to the bone; the ligament connecting the hyoid bone to the styloid process, and also the thyroid and cricoid cartilages were completely ossified: the hair was thin, and the alveolar processes of the jaws absorbed, thus proving the extreme old age of the exhumed."

5531. The skull of an aboriginal native of one of the Philippine Islands.

The cranium is short, moderately broad, rather low, with a narrow and receding forehead. The glabella is prominent through the development of the frontal sinuses; the nasals are moderately prominent, as are likewise the malars and upper jaw. The chin is well developed. The entire skull is rather small. The chief individual peculiarity is seen in the development of the right paroccipital, which is longer than the mastoid, and presents an articular surface for joining its homotype, the diapophysis, of the atlas. The left paroccipital tubercle is also well marked. The deviation from the Human type here presented, if compared with the skull of an inferior mammal, *e.g.* the Bear, or the Dog, will be perceived to be, a return to a more general type, which is manifested by the more constant development in the Mammalian series, of the paroccipitals or transverse processes of the occipital vertebra. The resemblance which the present Human skull presents to that of the Bear, in the size and shape of the paroccipital and mastoid processes of the right side, is very striking; and, if we compare the descriptions by Cuvier and De Blainville, of the skulls of the Carnivorous Quadrupeds, with nature, and especially with the aid of the comparison of such a variety of the Human skull as the one under description, we cannot but be impressed with the advantage and necessity of a particular name for a definite part, traceable and constant throughout a great part of the Mammalian series. In the skull of the Dog, for example, Cuvier figures ('Ossemens Fossiles,' tom. iv. plate xvi. figs. 20, 21 *d*) and describes (page 268) the process answering to the paroccipital in Man, as the 'mastoid':—"et derrière cette caisse une apophyse mastoïde comprimée et crochue, *d*." The true homologue of the mastoid process in Man, being comparatively feebly developed in the Dog, is neither described nor indicated in the figures, although it is correctly delineated in fig. 21, between *n*, the squamosal, and *d*, the paroccipital, to which Cuvier has transferred its name in this species of quadruped. But, in describing the skull of a

Bear, in which the mastoid is more developed, at least in breadth, than in the Dog, he applies its proper name to it, and says that the occipital has only a tubercle; meaning by that, his 'mastoïde' in the Dog, properly the paroccipital. Prof. De Blainville, in his description of the skull of the Bear, 'Ostéographie des Ursus,' p. 3, applies the term 'mastoïde' to both processes, distinguishing the one as the occipital and the other as the temporal mastoid.

Presented by Hugh Cuming, Esq., F.L.S.

5532. The atlas of the same native of the Philippines, showing the articular surface for the paroccipital at the back part of the right diapophysis.

Presented by Hugh Cuming, Esq., F.L.S.

5533. The axis of the same native of the Philippines.

Presented by Hugh Cuming, Esq., F.L.S.

5534. The three succeeding cervical vertebræ of the same native of the Philippines.

Presented by Hugh Cuming, Esq., F.L.S.

5535. The part called hyoid bone of the same native of the Philippines.

It consists of the basi-, cerato- and thyro-hyals. The right thyrohyal has maintained a free articulation with the basihyal. The stylohyals, which complete the hyoidean arch, are anchylosed, as usual, to the base of the skull.

Presented by Hugh Cuming, Esq., F.L.S.

5536. The two halves of the ossified thyroid cartilage of the same native of the Philippines. *Presented by Hugh Cuming, Esq., F.L.S.*

5537. The cranium of an aged male native of Saman, one of the Philippine Islands.

The cranium has the same general form as in No. 5531, but is more capacious, and the occipital region is higher and broader: the nasals are flatter; the glabella less prominent; the malars more inclined outwards at their under part; and the anterior plane of the maxillaries less depressed: the alveolar processes have been absorbed. The paroccipital tubercles are moderately prominent.

Presented by Hugh Cuming, Esq., F.L.S.

5538. The skull of an aged male native of Java.

It corresponds in the general shape of the cranium with the preceding; but the nasal bones are larger and much more prominent, and the fore part of the maxillaries is less flat. The malars are moderately prominent. The alveolar processes are almost wholly absorbed.

Presented by Sir Stamford Raffles, P.Z.S.

5539. The cranium of an Aboriginal of the island of Ceylon, of the race called Vedah or Veddah, from Bintenne.

The cranial cavity is of small size, with the forehead narrow and receding: the glabella is moderately prominent through the development of the frontal sinuses. The sutures are well marked; that of the lambdoid is particularly complex, and sinks below the level of the contiguous bones at its lower angles. The supramastoid ridge is well marked: the mastoids are moderately developed: the paroccipitals are rudimentary. The zygomatic processes of the temporals are very slender; those of the malars have the lower border convex, descending below them. The styliform processes of the alisphenoid are low, or short, subquadrate, but unusually extended backwards and outwards, overlapping the inner angle of the vaginal processes. A trace of the maxillo-premaxillary suture remains on the palate: the maxilla is slightly prognathic: the molar teeth are small. This cranium has probably belonged to a female: it agrees in the chief characters with the skull from the Philippines (No. 5531).

Presented by Colonel Hamilton Smith, F.R.S.

5540. The skull of a male Affghan.

The cranium resembles that of the Patagonians and modern Peruvians, being broad at the parietal protuberances, moderately convex above, high, broad, with a tendency to flattening behind. The forehead is narrow and rather sloping: the glabella is slightly prominent: the nasals come off almost in a line with it, and are very little produced. The malar bones are large, but not very prominent: the upper jaw is produced, and the chin is well developed.

As individual peculiarities may be noticed the division of the occipital condyles into two unequal facets.

Purchased.

5541. The skull of a male Hindoo, of the Coolie cast.

The cranium is narrower than in the preceding, particularly at the occipital region, which is high. The forehead is narrow and sloping: the glabella is prominent, and so are the nasals: the malars are moderately prominent: the upper jaw is much produced; the lower jaw has a square chin. The paroccipital tubercles are prominent. There are two canine teeth on the right side of the upper jaw. The rest of the permanent series is normal and complete.

Presented by Dr. G. M. Paterson.

5542. The skull of a low-cast Hindoo, who was a Thug.

It resembles in shape the preceding skull. The malar bones, though prominent, are smaller: the jaws are more produced and the chin is less marked. The walls of the cranium had been reduced to a thin and brittle plate, with the diploë almost obliterated. This skull shows a very extensive comminuted fracture, involving the malar, temporal, parietal, and occipital bones, and extending through the base of the cranium to the opposite side.

It is from an individual of that association of natives of Hindostan, notorious for their systematic mode of murder and plunder. The man to whom it belonged had been captured, and was knocked down by one of his fellow-prisoners with a brass drinking vessel: the light

and delicate texture of the cranium rendered the blow fatal from the extensive fractures which ensued.

Purchased.

5543. The skull of a male native of Eastern India.

The cranium is more capacious than in the two preceding specimens, but exemplifies the same type of form. The calvarium has been detached and shows the parietes to be thin, compact, with very little diploë. The glabella is moderately prominent: the nasals are narrow and prominent: the malars are slightly prominent. The upper jaw is less produced than in No. 5542.

Presented by Dr. Henderson.

5544. The skull of a young female Hindoo.

The last molar has not protruded in either jaw. The cranium is short, broad at the parietal protuberances, with a broad, lofty, flattened occipital region, and a narrow, rather receding forehead. The malars are small: the nasal bones are prominent, and the upper jaw is produced.

Purchased.

5545. The skull of a female Hindoo.

The permanent dentition is acquired. The occiput is narrow and more protuberant than in No. 5544: the prognathic character is more marked.

Purchased.

5546. The skull of a Hindoo youth, aged thirteen years.

The parietal protuberances are strongly marked, and the occiput is narrow and prominent. In the upper jaw the deciduous teeth have been shed, and succeeded by the permanent incisors, canines and premolars: in the lower jaw the last deciduous molar is retained: the second true molars are not in place in either jaw.

Purchased.

5547. The cranium of a Hindoo child, aged six years and a half.

The deciduous teeth and the first permanent true molars have been acquired: the second deciduous incisors appear to have been shed in the upper jaw: the lower left deciduous molars have decayed, and the hinder one has been shed.

Purchased.

5548. The skull of a Hindoo child, aged two years and a half.

The deciduous dentition has been acquired: the germs of some of the permanent teeth are exposed. The limits between the tympanic and petrosal are indicated by a vacuity where their coalescence has not been completed. The paroccipital tubercles are recognizable between the condyles and the small mastoids. The harmonia between the basi- and ex-occipitals is distinct. The maxillo-premaxillary sutures remain upon the palate.

Purchased.

5549. The cranium of a Hindoo child, marked two years and a half, but smaller and perhaps somewhat younger than the preceding.

The deciduous teeth have been acquired. The left exoccipital is distinct; the right is partially confluent with the superoccipital. The vacuity between the tympanic and petrosal is more filled up than in the previous skull. The mastoid processes are less developed. The maxillo-premaxillary sutures on the palate extend to the alveoli of the canine teeth.

Purchased.

5550. The cranium of a Hindoo child, marked two years.

The deciduous teeth have been acquired. The exoccipitals have coalesced with the superoccipital, but not with the basioccipital. The petrotympanic vacuity extends to the under part of the meatus auditorius externus.

Purchased.

In the foregoing skulls of immature Hindoos (Nos. 5546 to 5550), it is interesting to remark that the alisphenoids have attained, or nearly attained, their mature proportions, whilst the squamosals and malars participate in the inferiority of size of the facial bones which accords with the nonage of the individual.

5551. The cranium of a Hindoo child, with the deciduous dentition; the first permanent molars are not fully in place.

This is stated to have been from an idiot. As compared with No. 5550, the cranium is considerably shorter in proportion to its breadth and height. The forehead presents a similarity of form, indicating an equal development of the anterior lobes of the cerebrum, but the parietals are much shorter, and the superoccipital is bent almost vertically upwards from within a short distance of the foramen magnum, which is preternaturally near the back boundary of the basis cranii. The hinder part of this cranium is also unsymmetrically distorted.

Presented by Dr. G. M. Paterson.

5552. The cranium of a female Hindoo, native of Rajpootana.

It corresponds in general form with No. 5545. The paroccipital tubercles are defined.

Presented by Dr. G. M. Paterson.

5553. The cranium of a young Hindoo, native of Bengal.

The permanent canines and second true molars were coming into place: the last deciduous molar, left side, is not shed. It presents the usual Hindoo form, with an unsymmetrical occiput. The paroccipital tubercles are defined. The maxillo-premaxillary sutures on the palate extend to the interspace between the canine and incisive sockets.

Purchased.

5554. The cranium of a Hindoo, from Miampore, Bengal.

It presents the long and narrow shape, with the parietal protuberances very feebly marked. The upper contour describes a pretty regular arch or curve from the glabella to the deltoid suture, and the sides slope rapidly from the median line.

Mus. Sir A. P. Cooper, Bart.

5555. The skull of a male Gentoo.

The cranium is remarkable for its great length. The parietal protuberances are well marked, but the cranium does not exceed the average breadth at that part. The upper half of the occiput forms a convex protuberance. The forehead is narrow and very low. The nasals are large and prominent. The malars are large, but not very prominent. The maxilla is slightly produced. The chin is well developed. The mastoids and supramastoid ridges are large and much produced.

Purchased.

5556. The cranial portion of the skull of a Gentoo, from the banks of the Ganges.

It is long and narrow, but with the parietal protuberances unusually prominent. The sagittal suture is obliterated.

Mus. Brookes.

5557. The calvarium of the skull of a Gentoo, from the banks of the Ganges.

It is unusually long and narrow, but the parietal bones do not present that local prominence which characterizes the preceding. The sagittal suture is also here obliterated. The cranial walls are thin.

Mus. Brookes.

5558. The cranium of a Gentoo child.

The deciduous teeth have been acquired. The cranium presents the long and narrow type, but with the parietal protuberances unusually developed. The upper part of the superoccipital presents a protuberant convexity. The incisive alveoli are vertical as in other similarly immature Hindostan skulls, the prognathic character not being acquired, until the permanent teeth and their alveoli are fully developed. The palatal portions of the premaxillary sutures extend to the interspace between the canine and incisive alveoli. A large vacuity still exists in the basal wall of the meatus, but the vaginal processes are unusually developed for a child at this age.

Purchased.

5559. The cranium of a Mussulman, from the province of Bahar, Hindostan.

The cranium is of moderate size and proportions, with protuberant parietal prominences and with prominent malar bones. The upper jaw is slightly produced.

Presented by Dr. G. M. Paterson.

5560. The skull of a Mussulman, from the province of Delhi, Hindostan.

This presents the long and narrow type of cranium : the malars are more prominent than in the preceding : the maxilla is slightly produced.

Presented by Dr. G. M. Paterson.

5561. The cranium of a Patan Mussulman.

It is from an insane individual, imprisoned on account of homicide, and confined in the lunatic asylum at Calcutta. The cranium presents the ordinary Hindoo form, being fully ovate, broadest at the parietal protuberances, with the occiput moderately broad and high, and the forehead narrow and sloping. The squamosals are slightly convex : the nasals are large and prominent : the malars are moderately prominent : the maxilla is slightly produced. The eustachian processes are long and well defined.

Purchased.

5562. The cranium of an Arab.

The frontal region is as low, narrow, and sloping as in the Carib (No. 5403), but the cranium presents the average breadth in the parietal region. The occiput is convex. The frontal sinuses make the glabella prominent. The nasals are long, large, and prominent. The malars are small, not prominent. The upper jaw is a little produced. The mastoids are rather small, but the vaginal processes are strongly developed.

Mus. Sir A. Cooper, Bart.

5563. The cranium of an Asiatic Turk.

It presents the broad, short, and rounded form, which Blumenbach has described, with a narrow, low, receding forehead. But the intermixture of Caucasian blood is, perhaps, shown by the straight prominent nasals, the small malars, and the vertical upper jaw.

Purchased.

Egyptian Race.

5564. The skull of an ancient Egyptian, taken from a Mummy.

It is small and of delicate structure. The cranium is rather narrow in proportion to its length and is low, the forehead, however, ascending nearly vertically before it bends back into the moderately convex superior surface of the skull. The parietal protuberances are moderately developed. The upper half of the occiput narrow and prominent. The frontal suture is retained. The alisphenoid joins the parietal on both sides of the head. The glabella is almost flat, and the prominent nasals are continued from the same line with it. The malars are small and vertical, not laterally prominent ; but the prognathic character is well marked. The chin is narrow, but well produced. The mastoids are small, as are, likewise, the occipital condyles. The teeth are small and have been well worn. The bony palate is unusually deep. With the exception of the malars and nasals, the Ethiopian characters predominate in this skull, which appears to have belonged to a female.

Presented by C. H. Rogers Harrison, Esq.

5565. The skull of an ancient female Egyptian, taken from a Mummy.

It resembles in its general form and characters the preceding skull, but has been from a younger individual, the last molars having recently come into place, and the others being less worn. The frontal suture is obliterated. The occipital condyles are somewhat larger and more prominent. An accessory tubercle is developed from the inner side of the right upper last molar. The skull of the female Hindoo (No. 5545) most closely resembles Nos. 5564 and 5565 ; the chief difference being the minor depth of the bony palate. Much of the bituminous matter employed in the mummifying process remains in the present skull.

Mus. Ves. Pettigrew.

5566. The skull of an ancient male Egyptian, taken from a Mummy.

In the prognathic character this skull resembles the preceding, but it is larger and relatively broader at the parietal region, with stronger jaws and zygomatic arches.

Presented by Dr. Henderson.

5567. The cranium of an Egyptian, taken from the quarries at Memphis.

In its general size, in the shape of the cranium and the prominence of the upper jaw, it resembles that of the mummy (No. 5566).

Presented by John Bowring, Esq.

Phenician (?) Race.

5568. The skull of a Guanche, or aboriginal of the Island of Gran Canaria.

The cranium presents the moderate ovate contour, the forehead low but square, with the frontal protuberances well marked : the parietals are flattened above the temporal ridges : the upper half of the occiput is convex and prominent. The glabella is moderately prominent : the nasals are broad, prominent, slightly indented at their origin : the malars convex, but not inclined outwards : the maxilla slightly produced : the chin well marked. The size of the skull, state of the sutures, and abrasion of the premolars and first molars indicate the individual to have arrived at full maturity, if not middle life, but the third molars of the upper jaw seem not to have been developed ; those of the lower jaw project above the level of the adjoining grinders from the want of opposition. The molars and the palate are small. Wormian ossicles are developed in both squamous sutures, as well as in the ordinary position in the lambdoidal suture. The occipital and mandibular condyles have been broken away.

Presented by Sir George Grey, C.B.

Leucanian (white and light olive) variety.

European Races.

5569. The skeleton of a male European.

The metapophyses become distinct on the eleventh dorsal, are unusually long on the twelfth, and subside to tubercles on the anterior zygapophyses of the following lumbar vertebræ. The sacrum is here remarkable for the widely open neural canal of all the vertebræ.

Hunterian.

5570. The skeleton of an Englishman, with twenty-five true vertebræ.

The supplemental vertebra has the characters of a thirteenth dorsal on the right side and of a first lumbar on the left side. This arises from the distinct ossification of the fibrous basis of the pleurapophysis, on the right side, producing a false rib of nearly two inches in length, which articulates by a head and a tubercle with that side of the vertebra. Upon the opposite side the diapophysis is simply elongated by exogenous ossification extending from it into the same fibrous basis of the rib-element. The metapophysial and anapophysial tubercles manifest themselves above the diapophyses of the eleven dorsal vertebræ, become longer, and separate from each other on the twelfth, and become of equal distinctness on the supplemental vertebra last described. The anapophysis is likewise well developed on the right side of the succeeding vertebræ: it subsides to a ridge on the next lumbar and is most developed on the penultimate one. The neural arches of the first three sacrals are complete: a spine is developed from the first and second arches. The bifurcate spine of the fifth cervical is of unusual length. The body of the fourth cervical has been affected with ulceration. The forehead is narrow, low and sloping in this skeleton, which, as in the case of the male Frenchman, No. 5571, was of a convict.

Purchased.

5571. The skeleton of a Frenchman.

The European characteristics are well marked in the facial bones, but the forehead is unusually low and retreating. The metapophyses become distinct on the last dorsal and are much developed on the first lumbar, where also the anapophyses are present: the right diapophysis of this vertebra is thick and short; on the left side it is lengthened by the addition of a connate pleurapophysis.

Purchased.

5572. The skeleton of a French woman.

The sexual characters are well displayed in the more delicate forms and proportions of the bones, the narrower thorax, the more expanded pelvis, and more widely separated hip joints: the femur has a proportionally longer neck, set on at a less open angle with the shaft, than in the male. The metapophyses of the first lumbar are relatively less developed than in the male: the last ribs are relatively short.

Purchased.

The following, to No. 5707 inclusive, are parts of the same skeleton of a Frenchman:—

Purchased.

5573. The atlas.

It is larger, particularly in the transverse diameter, than that of the Esquimaux or the Australian. As compared with the latter, the zygapophyses and arterial foramina are proportionally larger. The diapophyses are broader and less obliquely twisted.

5574. The axis.

With the same superiority of size, it differs from that of the Esquimaux in the more backward inclination of the transverse processes and the deeper notch between these and the posterior zygapophyses. The spine is not so broad, but is higher. The notch between the post-zygapophysis and diapophysis is less deep in the Australian than in the Esquimaux.

5575. The third cervical vertebra.

In this, the character of the deeper notch between the zygapophysis and diapophysis is repeated. The spine is longer and more slender.

5576. The fourth cervical vertebra.

The notch between the diapophysis and zygapophysis is wider than in the Esquimaux and deeper than in the Australian. The spine is longer, and, as in the preceding vertebræ, is unsymmetrically bifurcate.

5577. The fifth cervical vertebra.

5578. The sixth cervical vertebra.

5579. The seventh cervical vertebra.

This shows a marked superiority of size over that of the Esquimaux, and still more so over that of the Australian. The diapophyses are thicker and more produced: both, but especially the right, are perforated by smaller foramina than those of the preceding cervical vertebræ. Besides the increase of size, this vertebra differs from the preceding in the minor depth of the anterior articular surface of the centrum, in the increase of that part transversely, and the absence of any prominent plate from the costal part of the transverse process which now forms simply the lower boundary of the arterial foramen; in the greater length, breadth and thickness of the diapophysial part of the same process; and in the greater length and thickness of the spine, which terminates in an obtuse enlargement notched behind but not bifurcate. The posterior zygapophyses are also relatively larger.

5580. The first dorsal vertebra.

The diapophyses are longer, and less inclined upwards than in the Esquimaux or Australian, and the aspect of the costal surface upon them is more directly downwards. In the Australian it looks more outwards than in the Esquimaux. The ridge along the lower part of the same process, here strongly developed, is feebly marked in the Esquimaux and is not present in the Australian. The produced parts of the border of the anterior articular surface of the centrum formed by the neurapophyses are more restricted to the upper and outer parts than in the preceding vertebræ.

5581. The second to the tenth dorsal vertebræ inclusive.

In each of these the aspect of the costal surface of the diapophysis is more directly downwards than in either the Esquimaux or Australian.

5582. The eleventh dorsal vertebra.

This vertebra is characterized, as in the Esquimaux and Australian, by the development of well-marked metapophyses from the upper and fore part of the diapophyses, which are shorter and less thick than in the foregoing vertebræ. The surface for the head of the rib has passed upon the side of the neural arch. This differs from the preceding vertebra in the distinct development of the metapophyses, in the diminished size of the diapophyses, which now cease to show the well-defined articular surface, and in the diminished length with increased thickness of the spine.

5583. The twelfth dorsal vertebra.

This differs from that of the Esquimaux in the articular surface for the rib being still confined to the side of the base of the neurapophysis and not transferred to the diapophysis, which is short and obtusely pointed. The neural spine has a less antero-posterior extent, and a more expanded summit. This vertebra differs from the eleventh dorsal in the superaddition of small but distinct anapophyses, in the increase of the metapophyses and diminution of the diapophyses. The posterior zygapophyses are smaller, and are convex, instead of flat or slightly concave, surfaces; and those surfaces are turned more obliquely outwards. The hinder half of the neural arch is narrower.

5584. The first lumbar vertebra.

This differs from that of the Esquimaux in having the metapophysial tubercles larger and the anapophysial ones smaller: the diapophyses are shorter, but broader: the neural canal is wider in proportion to the size of the centrum. As compared with that of the Australian, besides the general superiority of size, the difference is chiefly marked in the much longer and larger diapophysis of the Frenchman's vertebra. As compared with the last dorsal vertebra, besides the usual difference of absence of the costal articular surface may be noted the diminution of the metapophysis and its approximation to the anterior zygapophysis, which has now a concave surface directed obliquely upwards and inwards. The two tubercles, which terminate the posterior ridge of the neural spine below in the tenth, eleventh and twelfth dorsal vertebræ, are here further apart and advanced upon the back part of the posterior zygapophyses.

5585. The second lumbar vertebra.

The transverse processes of this vertebra are relatively longer than in the Australian, and the spine is higher in proportion to its antero-posterior extent. The tubercles behind the posterior zygapophyses are more distinctly developed. The anapophyses have subsided to mere ridges.

5586. The third lumbar vertebra.

That of the Esquimaux differs from it chiefly in the retention of the anapophyses. The zygapophyses are less widely apart in the Esquimaux. The distance between the zygapophyses in each pair is the same in the Australian as in the European, although the vertebra itself is smaller in the Australian.

5587. The fourth lumbar vertebra.

The zygapophyses are relatively larger than in the Esquimaux, and the whole neural arch with its processes are larger in proportion to the centrum than in the Australian; the spine more particularly is longer. This vertebra differs from the foregoing in the reappearance of the anapophysis upon the back part of the base of the diapophysis. Three ridges radiate from it; one to the diapophysis, another to the anterior zygapophysis, a third to the side of the neural arch.

5588. The fifth lumbar vertebra.

The posterior zygapophyses are larger and wider apart than in the Esquimaux, and are larger but not wider apart than in the Australian: the spine is longer than in either of those varieties: the diapophyses are much thicker than in the Australian. The fifth differs from the fourth lumbar vertebra chiefly in the shortening and thickening of the diapophyses, at the back part of which the anapophyses are reduced to tubercles. The metapophyses now appear as simple thickenings upon the upper border of the anterior zygapophyses. The posterior zygapophyses are larger; their articular surface is concave, and looks more directly downwards. The neural spine is reduced, particularly in antero-posterior extent.

5589. The sacrum.

It consists of six anchylosed vertebræ, the supplemental one being at the caudal extremity of the bone. The first vertebra of the coccyx has nevertheless its usual size and shape: the sacrum is consequently longer in proportion to its breadth than in the Esquimaux, and larger in all dimensions, with a deeper anterior concavity, than in the Australian. The so-called transverse processes of the first sacral vertebra slope more downwards from the anterior articular surface of the centrum than in the Esquimaux, the direction being more like that in the Australian. The anterior zygapophyses also resemble those of the Australian in being larger and more sessile than in the Esquimaux, and the tuberosity which extends outwards and forwards from their base is much less produced than in the Esquimaux. The articular surface for the ilium terminates on the same transverse line with the third sacral foramen, as in the Australian. In the Esquimaux it extends very little beyond the second sacral foramen. In the present sacrum the neural arch is completed over four vertebræ and supports a spine: in the last two sacral vertebræ the neurapophysis coalesces with its homotype of the contiguous vertebra, but not with its fellow in the same vertebra.

5590. The coccyx.

It consists of, at least, three anchylosed vertebræ. The neurapophyses of the first are limited as usual to the part which represents the anterior zygapophyses in other vertebræ.

5591. The sternum, with the cartilages of the true ribs attached.

The manubrium is larger, its clavicular angles are more produced, and the clavicular articulations more oblong, than in the Esquimaux and the Australian. It is flatter and broader in proportion to its thickness at its lower part than in the Australian. The four pieces composing the body of the sternum have completely coalesced in this, as in most adult Europeans: but, in the Esquimaux, the first and second elements continue distinct, and the harmonia between the third and fourth is only partially obliterated. The xiphoid piece in the present sternum is ossified and bifurcate at the extremity which supports the cartilaginous appendage: the ossified part is almost concealed by the converging extremities of the sixth and seventh pairs of rib-cartilages.

5592. The first pair of thoracic ribs.

They are longer and larger than in the Esquimaux, have smaller heads and less produced tubercles, are broader, flatter, and thinner at their sternal ends, and, upon the whole, are more curved, resembling in this respect the same pair in the Australian.

5593. The second pair of ribs.

They are longer, broader, and describe a fuller curve than in the Esquimaux.

5594. The third pair of ribs.

5595. The fourth to the eleventh pairs of ribs inclusive.

5596. The last pair of ribs.

They are of unequal length; one of them, in this respect, equalling its homologue in the Esquimaux, the other being as short as in the Australian.

5597. The left clavicle.

The surface below the sternal end for the attachment of the subclavius is better defined than in the Esquimaux, and resembles more, in that respect, the Australian clavicle; but, like that of the Esquimaux, it differs from the Australian in the greater expansion of the scapular end of the bone.

5598. The left scapula.

It is larger than that of the Esquimaux or Australian. The angle which the supraspinal part of the base forms with the rest of the base resembles that in the Esquimaux, but does not meet the superior costa at so produced an angle. The inferior angle is truncate, as in the Australian. The acromion is longer and broader than in either of the above-cited scapulæ. The glenoid cavity is broader in proportion to its length, the coracoid is stronger and more produced, than in the Australian.

5599. The left humerus.

This bone, in the proportions of its length to its thickness, is intermediate between that of the Australian and Esquimaux. The head is larger than in the Esquimaux: the distal extremity more expanded than in the Australian: the median trochlear prominence is more marked than in either.

5600. The left radius.

The proportions of this bone are of the same intermediate character. The proximal articular end is relatively larger: the difference in the size of the distal end, as compared with that of the Esquimaux, is less.

5601. The left ulna.

The proximal articular end is larger, and the lesser sigmoid cavity is more nearly semicircular, and less oblong, than in the Esquimaux or Australian. The ridge continued downwards from its back part is more produced. The size of the distal end more nearly resembles that of the Esquimaux.

5602. The right clavicle.

5603. The right scapula.

5604. The right humerus.

5605. The right radius.

5606. The right ulna.

5607. The right scaphoïdes.

5608. The right lunare.

5609. The right cuneiforme.

5610. The right trapezium

5611. The right trapezoïdes.

5612. The right os magnum.

5613. The right unciforme.

5614. The right pisiforme.

5615. The right first metacarpal, or that of the pollex.

5616. The right second metacarpal.

5617. The right third metacarpal.

5618. The right fourth metacarpal.

5619. The right fifth metacarpal.

5620. The second, which is the ungual, phalanx of the right pollex.

5621. The second phalanx of the right index.

5622. The second phalanx of the right medius.

5623. The second phalanx of the right annularis.

5624. The second phalanx of the right minimus.

5625. The third phalanx of the right index.

5626. The third phalanx of the right medius.

5627. The third phalanx of the right annularis.

5628. The third phalanx of the right minimus.

5629. The left scaphoïdes.

5630. The left lunare.

5631. The left cuneiforme.

5632. The left pisiforme.

5633. The left trapezium.

5634. The left trapezoïdes.

5635. The left os magnum.

5636. The left unciforme.

5637. The metacarpal of the left pollex. 5638. The metacarpal of the left index.

5639. The metacarpal of the left medius.

5640. The metacarpal of the left annularis.

5641. The metacarpal of the left minimus.

5642. The first phalanx of the left pollex.

5643. The first phalanx of the left index.

5644. The first phalanx of the left medius.

5645. The first phalanx of the left annularis.

5646. The first phalanx of the left minimus.

5647. The second phalanx of the pollex.

5648. The second phalanx of the index.

5649. The second phalanx of the medius.

5650. The second phalanx of the annularis.

5651. The second phalanx of the minimus.

5652. The third phalanx of the index. 5653. The third phalanx of the medius.

5654. The third phalanx of the annularis.

5655. The third phalanx of the minimus.

5656. The left os innominatum.

Besides its general superiority of size, the ilium is more concave anteriorly, the foramen obturatorium relatively smaller and with a more triangular contour, the symphysis pubis more produced, as well as the anterior superior angle of the ilium, and the supracotyloid protuberance of the pubis is more elevated, than in the os innominatum of the Esquimaux. All these differences are more striking in comparison with the same bone in the Australian.

5657. The left femur.

The neck is longer and forms a rather less obtuse angle with the shaft than in the Esquimaux: the intertrochanterian tuberosity is better developed: the posterior ridge of the shaft is less marked: the ridge above the inner condyle is more developed: the small trochanter is less produced. All these differences are more marked in comparison with the femur of the Australian, except that offered by the epicondyloid ridge.

5658. The left tibia.

It is longer in proportion than in the Esquimaux, and is flatter at the back part of its distal half. It is flatter at the back part of its middle third than in the Australian, and the shaft is less compressed. The protuberance behind the distal articular end is more marked, and the distal articular surface has a greater antero-posterior extent in the European than in the Australian.

5659. The left fibula.

It presents the same difference of proportion as to length compared with that of the Esquimaux, and differs from that of the Australian in the minor degree of excavation of its anterior surface.

5660. The left astragalus.

5661. The left calcaneum.

5662. The left naviculare.

5663. The left cuboïdes.

5664. The left entocuneiforme.

5665. The left mesocuneiforme.

5666. The left ectocuneiforme.

5667. The metatarsal of the left hallux, or great toe.

5668. The metatarsal of the left second toe.

5669. The metatarsal of the left third toe.

5670. The metatarsal of the left fourth toe.

5671. The metatarsal of the left fifth toe.

5672. The first phalanx of the left hallux.

5673. The first phalanx of the left second toe.

5674. The first phalanx of the left third toe.

5675. The first phalanx of the left fourth toe.

5676. The first phalanx of the left fifth toe.

5677. The second, or ungual, phalanx of the left hallux.

5678. The second phalanx of the left second toe.

5679. The second phalanx of the left third toe.

5680. The second phalanx of the left fourth toe.

5681. The second phalanx of the left fifth toe.

5682. The distal phalanges of the remaining toes, and the sesamoids of the hallux, of the same left foot.

5683. The right os innominatum.

5684. The right femur.

5685. The right tibia.

5686. The right fibula.

5687. The right astragalus.

5688. The right calcaneum.

5689. The right naviculare.

5690. The right entocuneiforme.

5691. The right mesocuneiforme.

5692. The right ectocuneiforme.

5693. The right cuboïdes.

5694. The metatarsal of the right hallux.

5695. The metatarsal of the right second toe.

5696. The metatarsal of the right third toe.

5697. The metatarsal of the right fourth toe.

5698. The metatarsal of the right fifth toe.

5699. The first phalanx of the right hallux.

5700. The first phalanx of the right second toe.

5701. The first phalanx of the right third toe.

5702. The first phalanx of the right fourth toe.

5703. The first phalanx of the right fifth toe.

5704. The second phalanx of the right hallux.

5705. The second phalanx of the right second toe.

5706. The remaining phalanges and sesamoid bones of the right foot.

5707. The patellæ.

The following specimens, to No. 5750 inclusive, illustrate the modifications of form in the skull of the White races:—

5708. A plaster cast of the cranium of an ancient aboriginal of Scandinavia.

The cranium presents the type of the modern Peruvian, being short, broad, with a high, flattened and slightly unsymmetrical occiput, and with a low and narrow forehead. The glabella is slightly produced; the nasals are prominent: the orbits are unusually contracted in their vertical diameter: the upper jaw is produced. Some of the Australian skulls, Nos. 5314, 5317, 5326, for example, and the Chinese skull, No. 5491, approach the present in the peculiarly depressed orbits, but this would seem to be rather an individual character than one of race.

This is the type of a class of skulls called 'brachycephalic,' by the

Donor, Professor Retzius.

5709. A plaster cast of the cranium of an ancient aboriginal of Scandinavia, regarded as the Celt.

The cranium is long in proportion to its breadth, and resembles in size and shape the Gentoo skull, No. 5553.

This is the type of a class of skulls called 'dolichocephalic,' by the

Donor, Professor Retzius.

The series of Æthiopian and Asiatic skulls, above described, show, that although many skulls may be classed as 'long' and 'short,' such a distinction is artificial, and groups together individual skulls from various natural races of Mankind.

5710. A plaster cast of the cranium of an ancient inhabitant of Denmark, from the island of Möen.

It is concluded to have belonged to an individual inhumed at a period prior to a knowledge of the working or use of metals in Denmark. The cranium is less expanded at the parietal region than in No. 5708, but resembles it in the shape of the forehead, in the prominence of the nasal bones, in the broad and produced upper jaw, and in the small depressed orbits.

Presented by Prof. Eschricht.

5711. The skull of a native of Lapland.

The cranium presents a full oval figure, broadest at the parietal region, without any particular prominence except that of the occiput, which is associated with numerous wormian ossicles in the lambdoidal suture. The suture between the ex- and super-occipital is retained on the right side, and partially so on the left. The malar bones are small and slightly pro-

minent, as compared with the Greenlander. The upper jaw is vertical and the chin well developed.

Presented by Prof. Eschricht.

5712. A skull of an ancient inhabitant of Britain, from a tumulus near York.

The cranium presents a subelongate oval form, with a narrow and moderately elevated forehead. The parietal protuberances are not well marked. The occiput is rounded and convex. The malars are vertical, and are not prominent. The upper jaw is slightly produced. The chin is well marked.

The following is from the Abstract of the Donor's Memoir on the collection of remains to which the present skull belonged, communicated to the 'Yorkshire Philosophical Society':—

"The skeletons are those of persons of both sexes; but those of adult males appear to preponderate. A few skeletons of children, and a few bones of decidedly old persons, were also found. The teeth are uniformly much worn down, as if from the use of food of the coarsest and hardest kinds. This condition of the teeth is very characteristic. The skulls are generally small, and their prevailing shape is elongated and partially pyramidal; the region of the forehead being decidedly narrow and low. In addition to the human remains, there have been found numerous bones of animals, and particularly those of a small ox, the *Bos longifrons* of Owen. These were found in the immediate neighbourhood, and almost in contact with human bones and skeletons. Some bones of the horse and of a deer were also found. Several rude iron nails, and numerous pieces of clumsy iron bar, bent at a right angle, some of them perforated by nails and covered with a very thick rust, were also discovered. The most probable opinion respecting these is that of their having formed the fastenings of coffins, in which the bodies had been deposited. Several small pieces of decayed wood were likewise found. Two or three fragments of tile, evidently Roman, were found at a depth of about ten feet in the centre of the tumulus. These were accompanied by two or three pieces of Samian ware, and a few fragments of coarse earthenware, covered with a green glaze. In the very centre of the hill, on the level of the undisturbed skeletons, a large urn was discovered. This urn measures twelve inches in height, and has a capacity of three imperial gallons. It is formed of a very hard and coarse ware, of a dirty brick-red colour. Part of the surface is somewhat corroded, and presents numerous fragments of broken pebbles and even granite. There was nothing but some clayey soil found in this urn, but it was supposed that it had contained a deposit of burnt bones, which had been scattered when the mound was disturbed.

"This sepulchral mound is of a very remarkable character, and does not correspond with any of the numerous tumuli or other ancient cemeteries which have been described. It has indeed been a cemetery rather than a barrow. Dr. Thurnam thought it may be properly spoken of as a *tumulary cemetery*. He referred it to the early Saxon Christians of the seventh or eighth century—a period when the burial of the dead was not allowed in towns, and when there was no church-yard within the walls of York."

Presented by Dr. Thurnam.

5713. A skull found in digging a drain near Whitehall Stairs: there were two other skulls and many loose bones found in the same spot.

This skull, with its narrow and receding forehead and large jaws, indicates it to have belonged to a physically powerful, but mentally inferior, individual. The upper jaw is less produced than in the preceding skull.

Presented by William Lynn, Esq.

5714. The cranium of a Servian soldier.

It presents the short and broad form of skull, with the occiput higher and more flattened than in No. 5713, and with the narrow forehead still more sloping. The nasal bones are prominent: the malars small: the upper jaw very little produced. The teeth which remain in this cranium have been worn to the stumps.

Presented by J. W. G. Gutch, Esq.

5715. A part of the mutilated cranium of a Servian soldier.

It shows a similarly contracted forehead, but with the occiput much more prominent than in the preceding specimen.

Presented by J. W. G. Gutch, Esq.

5716. The skull of a modern Greek.

The cranium is rather narrow, and the parietal protuberances are slightly marked: the forehead rises almost vertically: there is a slight depression between the glabella and nose. The upper jaw is a little produced.

Presented by Dr. John Davy, F.R.S.

5717. The cranium of a Greek.

It is somewhat broader in proportion to its length, with a similarly well-formed, although not very lofty, forehead. The nasals are continued from the same line as the glabella. The malar bones are small, subvertical, and with the orbital parietes neatly defined, as in No. 5716. The vaginal processes are unusually developed in the present cranium.

Presented by Dr. John Davy, F.R.S.

5718. The cranium of a Piedmontese.

It is broader in proportion to its length than in the Grecian skull, and the occipital region is higher, broader, and less prominent, being somewhat unsymmetrically flattened, as in the Peruvian skulls, and, perhaps, from a similar cause. The forehead is low and receding: the glabella is prominent; the nasal bones are unusually so, and are subcompressed: the malars are vertical: the upper jaw is not produced.

Mus. South.

The following specimens, to No. 5730 inclusive, were extracted from the Catacombs at Paris, and are, therefore, probably French. In six of them the frontal suture is persistent; and, in most of them, the high, broad, rather short, subspherical form of the cranium prevails.

Presented by Dr. Leach, F.L.S.

5719. A skull.

5720. The cranium, wanting the lower jaw, and with the left zygomatic arch and part of the upper jaw broken away.

The outer alveolar plate has been removed from the teeth in place, showing the length of the fang of the canine, and the double external root of the contiguous bicuspid. The second bicuspid has that root single.

5721. The cranium, with the occipital region mutilated.

5722. The cranium.

The nasal bones come off in a line with the glabella and are long and prominent.

5723. The cranium, slightly mutilated at the foramen occipitale.

The alveoli have been absorbed: notwithstanding this indication of the age of the individual, the frontal suture is not obliterated, whilst the extremities of the coronal suture are so.

5724. A similarly aged cranium, with the frontal suture persistent.

The paroccipitals are prominent.

5725. A cranium.

It presents the full rounded form like that of the Turk (No. 5563), but with small and vertical malar bones, and the upper jaw not produced. The prominent nasals are distorted to the right side. A great part of the sagittal suture and the frontal suture are obliterated.

5726. A cranium.

A great part of the sagittal and lambdoidal sutures and the frontal suture are obliterated. The nasal process of the premaxillary as well as the nasal bones are unusually prominent. The paroccipital tubercles are distinct.

5727. A cranium.

The sagittal as well as the frontal sutures are obliterated.

5728. A cranium.

Part of the sagittal suture and the frontal suture are obliterated. There is an unusual prominence of the fore part of the border of the foramen magnum, the middle of which presents a slightly flattened surface on the basioccipital, doubtless for articulation with the body of the atlas.

5729. A cranium.

The nasal and sagittal sutures and the frontal suture are obliterated. The paroccipital tubercles are distinct. The cranium is long and narrow, with a contracted protuberant occiput.

5730. A cranium.

It presents a similarly narrow, elongated form, with a narrow protuberant occiput. The nasals are continued in a line with the glabella, are prominent and nearly straight: the cheek-bones are small and delicate: the orbits are large and well defined. Both this and the preceding skulls (Nos. 5728 & 5729) present the feminine characters.

5731. The skull of a Highlander or Celtic Scot, with the mature dentition complete.

The cranium presents moderate proportions, with the upper contour forming a regular and full curve from the glabella to the occiput. The parietal protuberances are slightly marked: the squamosal region is convex: the glabella prominent, and overhanging the narrow, sunken, although prominent, nasals. The orbits are small, particularly in the vertical diameter, as in the ancient Scandinavians (Nos. 5708 & 5709). The upper jaw is slightly prominent: the lower jaw shows a good chin. The styliform processes of the sphenoid are unusually developed.

Mus. Langstaff.

5732. The cranium, said to be of a Scot.

It is remarkable for its length, narrowness, and sudden slope of the sides of the calvarium from the prominent median line. This much resembles the calvarium of the Gentoo (No. 5557).

Presented by Sir Everard Home, Bart., V.P.R.S.

The following skulls, to No. 5750 inclusive, are either of certified English, or uncertified skulls presenting the European or English type, and, therefore, most probably English.

5733. The skull of an Englishman.

It exhibits well the characteristics ascribed by Blumenbach to his Caucasian race. The contour of the cranium, as well as that of the face, is oval: the forehead is moderately vertical, high, and broad: the nasal bones are prominent and well developed: the malars are vertical, and the orbital boundaries are neatly defined. The upper jaw is not produced: the lower jaw has the chin well marked.

Purchased.

5734. The skull of an Englishman. *Purchased.*

5735. The skull of a European, corresponding in its general characters with the preceding. *Hunterian.*

5736. The skull of a European, presenting the same general characters of an English skull. *Hunterian.*

5737. The skull of an Englishman. The cranium, though well formed, is smaller than the average. There is an ulcerated aperture in the bony palate.

Presented by Dr. Henderson.

5738. The skull of an Englishman.

It shows an unusual vertical expanse of the orbits, and the fore part of the maxillaries are deeply excavated. The upper half of the superoccipital is very prominent, with the usual concomitant of many wormian bones in the deltoid suture. The paroccipital tubercles are distinct. The auditory meatus is narrower than usual.

Purchased.

5739. The skull of an Englishman. It shows partial ulcerations of the frontal and parietal bones. *Purchased.*

5740. The skull of an English woman.

The calvarium has been detached. The paroccipitals are distinct. Traces of the maxillo-premaxillary sutures remain upon the palate.

Hunterian.

5741. The skull of an Englishman.

It presents the short and broad type of cranium, with a broad, high, and vertical occiput. The paroccipital tubercles are distinct.

Purchased.

5742. The skull of a European.

It shows a rather sloping forehead, and slightly prominent upper jaw. The vertical malars and well-developed nasal bones conform to the civilized European type. The palatal portions of the maxillo-premaxillary sutures are retained.

Hunterian.

5743. The skull of a male European.

It has a low, narrow, sloping forehead, and slightly prognathic jaws. The paroccipital tubercles are distinct.

Hunterian.

5744. The skull of a European.

It presents the subelongate type of form.

Hunterian.

5745. The cranium of a European.

It is broad and low, as well as moderately long. The frontal suture is persistent.

Hunterian.

5746. The left moiety of a vertically bisected cranium of a European.

It is shorter in proportion to its height and breadth than in the preceding, and with the frontal suture persistent. The paroccipital tubercles are distinct.

Hunterian.

5747. The cranium of a European, apparently female.

The right maxilla is much depressed.

Hunterian.

5748. The cranium of a European.

It presents the short, broad, rounded type. Each occipital condyle is bisected by a groove.

Hunterian.

5749. The cranium of a European.

It presents the short, broad type, with a high, broad, vertical occiput. The paroccipital tubercles are distinct: the nasals are low: the malars and upper jaw are prominent.

Hunterian.

5750. The cranium of a European.

It presents the subelongate, rather narrow type, with the sides of the calvarium sloping from the median eminence. The malars are vertical and small: the upper jaw is slightly produced: the nasals are large and prominent. There are traces of the premaxillary sutures on the palate.

Presented by Dr. Leach, F.L.S.

The following crania, to No. 5754 inclusive, have not their origin or country satisfactorily certified.

5751. A cranium.

It presents the short and broad type, with a narrow, low forehead, and the high, broad, and subdepressed occiput, as in the skulls of the modern Peruvians. The upper jaw is prognathic: the malar bones are not prominent.

Hunterian.

5752. A cranium.

It is narrow, with the nasals broad and not prominent: the malars are vertical: the maxilla is produced.

Hunterian.

5753. A cranium.

It is of larger size than the preceding, is long, moderately broad, with the parietal protuberances slightly marked. The forehead recedes, but the nasals are large and prominent: the upper jaw is vertical, and the teeth and bony palate present the usual European proportions. The alisphenoids unite largely with the parietals.

Hunterian.

5754. A cranium of a male.

It is moderately long and narrow, broadest at the parietal protuberances, with the forehead narrow and rather low: the glabella is moderately prominent: the superorbital ridges are thin and well defined: the malars are slightly prominent: the maxilla is a little produced. The molar teeth do not exceed the ordinary European proportions. The alisphenoids join the parietals. The median ridge of the palate is unusually produced. This cranium is ascribed to a "Native of New Holland" in the Osteological Catalogue of 1831, No. 93, p. 16, but, if it were brought from that country, it has belonged to some White colonist.

Hunterian.

The following specimens, to No. 5765 inclusive, show characters of the Human cranium, displayed by different sections.

5755. The right moiety of a vertically bisected cranium of a Tasmanian.

It shows the great thickness of the walls and the contracted capacity of the cranium, as compared with that in the educated White races. The regularity of the curve described by the wall from the glabella to the occipital ridge and the oblique anterior production of the jaw are also characteristic features. As individual peculiarities may be noticed, the wormian bone interposed between the alisphenoid and parietal, the persistent trace of the premaxillary suture, and the vertical contraction of the orbit.

Presented by Ronald Gunn, Esq.

5756. The right moiety of a vertically bisected cranium of a male African Negro.

At the occipital and parietal regions the cranial walls equal those of the Australian in thickness, but not at the frontal region. The capacity of the cranium is greater, especially in the longitudinal direction. The upper curve is less regular. The middle fossa is deeper and larger. The upper jaw is less produced.

Purchased.

5757. The right moiety of a vertically bisected cranium of an African Negress.

It corresponds with the preceding in its general characters, allowance being made for the sexual inferiority of size and the inferior development of the frontal sinuses.

Hunterian.

5758. The right moiety of a vertically bisected cranium of an Esquimaux.

The parietes of the cranium are thinner and its capacity greater than in the Australian, but do not exceed those in the Negro. The entocondyloid prominence is less developed than in the Negro and Australian. The upper jaw is rather less produced than in the Negro, but the distance between the back part of the basioccipital and the fore part of the premaxillary is as great, and there is much diploë in the basioccipital.

Prepared in 1852.

5759. The right moiety of a vertically bisected cranium of a European.

It shows a greater vertical capacity, especially at the frontal region, than in the foregoing cranial sections; but is chiefly distinguished by the shorter and less produced upper jaw, and by the minor extent of the facial part between the basioccipital and premaxillary. The basioccipital is of much less vertical extent, and contains less diploë; and the entocondyloid prominence is less developed.

Hunterian.

In the three following skulls, a vertical section has been made through the middle of the left orbit.

Prepared in 1852.

5760. The cranium of an Australian. *Presented by George Bennett, Esq., F.L.S.*

5761. The cranium of a male African Negro, of the subelongate type, moderately protuberant at the parietal region, narrow and rather lower at the frontal region; with broad, flattened nasals, protuberant malars, and broad and produced upper jaw.

The section shows the dense and thick parietes of the cranium, and, as compared with the Australian skull, No. 5760, a greater depth of the cavity at its hinder third, greater thickness of the parts supporting the cerebellum, and a more oblique position of the base of the alisphenoid. The right paroccipital is well developed.

5762. The cranium of an Englishman. *Prepared in* 1852.

On comparing together the preceding skulls of the Australian, the Negro, and the European, it will be seen that the fore part or entry of the orbit in the two Black races is more contracted, chiefly by the production downwards of its roof at that part. In the European it is more open, as if from a more habitual and freer upward gaze. The cranial parietes are thicker and denser in the Black races. The divided part of the alisphenoid is thicker, and the space between that and the orbitosphenoid is less. The basal fossa for the natiform protuberance is larger in the European than in the African Negro, and deeper in the Negro than in the Australian. The characteristic magnitude of the molars is well displayed in the Australian skull.

5763. The hinder moiety of a vertically and transversely bisected cranium of a Tasmanian.

It shows the angle at which the sloping sides of the calvarium meet at the sagittal prominence.

Prepared in 1852.

5764. The hinder moiety of a vertically and transversely bisected cranium of a Greenlander.

It shows the vertical ascent of the lateral walls of the cranium from above the base of the zygoma for a certain height, and then their gradual converging curve, to where they meet at the elevated median line, resembling a Gothic arch.

In the Australian, the cranial parietes at the same part incline outwards to the parietal protuberances before they converge to the elevated median line, the cranium being narrower, its parietes thicker, and the overlapping part of the squamosal less extensive than in the Greenlander. But the increase of thickness in the part of the parietal which is so overlapped is well marked in the Greenlander. This cranium is also characterized by the great breadth and depth of the basioccipital. As individual peculiarities may be noticed, the strong supra-mastoid ridges and the great depth of the lower part of the meatus auditorius. The par-occipital protuberances are also developed.

Prepared in 1852.

5765. The hinder part of a vertically and transversely bisected skull of an Englishman.

This differs from the preceding by the outward inclination of the cranial walls where they rise above the root of the zygoma, and by the more sudden inclination of the upper part of the arch to its vertex or key-stone. Here also may be noticed the increased thickness of the parietal where it is overlapped by the squamosal. The basioccipital has more diploë and less dense walls than in the Australian, and is more concave superiorly.

Prepared in 1852.

The following specimens, to No. 5813 inclusive, exhibit the texture of different parts of the Human skeleton.

5766. A vertical transverse section of the Human cranium.

It includes the coronal suture, with the contiguous parts of the frontal and parietals, and with part of the basioccipital, sphenoid and squamosals. The minutely cellular structure included between the outer and inner compact layers of bone is termed the 'diploë': it is most abundant in the basioccipital and at the bases of the alisphenoids, and is traceable throughout the frontals and parietals, but is absent in the greater part of the squamosal. The cells in the body of the sphenoid are much larger, and have received air. The mechanical application of the squamosals as buttresses, applied against the alisphenoids and parietals, is well shown in this section.

Hunterian.

5767. The axis vertebra, vertically and longitudinally bisected.

The line of the obliterated harmonia between the odontoid and the body of the axis is indicated by the inward extension of the compact wall, and the structure of the odontoid process is denser than that of the body of the axis.

Prepared in 1851.

5768. The fifth cervical vertebra, vertically and longitudinally bisected.

The structure of the spine is denser than that of the body.

Prepared in 1851.

5769. The seventh cervical vertebra, vertically and transversely bisected.

The compact layer of bone immediately surrounding the neural canal is thickest above and laterally.

Prepared in 1851.

5770. A similar preparation, showing the same structure. *Prepared in* 1851.

5771. A middle dorsal vertebra, vertically and longitudinally bisected.

It shows the thick, compact walls of the spine, and the vascular canal continued from the neural canal into the cancellous structure of the body.

Prepared in 1851.

5772. The twelfth dorsal vertebra, vertically and transversely bisected.

It shows the thick compact anterior wall of the spine and the vascular canal of the centrum.

Prepared in 1851.

5773. The second lumbar vertebra, vertically and longitudinally bisected.

The compact wall of the spine is thickest at its base: the cancellous structure is more open than in the preceding vertebræ.

Prepared in 1851.

5774. The second lumbar vertebra, vertically and transversely bisected.

It shows the great thickness of the compact walls which form the roof of the neural canal and the base of the spine. In this section the walls of the cancelli of the centrum manifest a tendency to a radiate disposition, diverging towards the periphery.

Prepared in 1851.

5775. The fourth lumbar vertebra, vertically and transversely bisected.

It shows the large proportion of the compact tissue at the roof of the neural canal and the base of the spine.

Prepared in 1851.

5776. The third lumbar vertebra, vertically and longitudinally bisected.

Here the walls of the cancelli of the centrum decussate at right angles, intersecting minute quadrangular spaces.

Prepared in 1851.

5777. The sacrum, vertically and longitudinally bisected.

It shows the vacant spaces between the centrums, which have retained a remnant of the intervertebral substance.

Prepared in 1851.

5778. The sacrum, transversely bisected through the middle of the second vertebra.

Prepared in 1851.

5779. The body of the sternum, longitudinally and transversely bisected.

It is remarkable for the extremely thin, scarcely recognizable, layer of the external compact tissue, which encloses the uniformly fine cancellous texture.

Prepared in 1851.

5780. The first rib, longitudinally bisected.

It shows the superior thickness of the compact texture forming its concave margin.

Prepared in 1851.

5781. A sixth rib, longitudinally and horizontally bisected.

The difference of thickness of the compact wall at the concave and convex margins is only perceptible towards the middle of the rib, and is much less marked than in the first rib.

Prepared in 1851.

5782. A sixth rib, longitudinally and vertically bisected. *Prepared in* 1851.

5783. The clavicle, longitudinally bisected.

The compact wall is thickest at the concave side of each of its curves.

Prepared in 1851.

5784. The scapula of the left side, transversely bisected through the middle of the glenoid cavity.

It shows the character of the diploë at that part, its absence in the thin compact body of the scapula, and its reappearance in a minute quantity in the thickened basal border.

Hunterian.

5785. The upper moiety of a similarly bisected scapula, in which the texture of the coracoid and acromion is exposed in longitudinal section. *Hunterian.*

5786. The upper moiety of a similarly bisected scapula of a Child.

The coracoid element has not coalesced with the proper scapular one, and is wanting.

Hunterian.

5787. The upper moiety of a similarly bisected scapula of an Infant.

The coracoid element remains attached by dried cartilage to the scapula proper. By comparing the present with the two preceding specimens, it will be seen that the proportion of the cancellous texture near the glenoid cavity does not increase in the same ratio as the compact lamellar part of the bone, but forms a larger proportion of the scapula in the Infant.

Hunterian.

5788. The posterior moiety of a longitudinally bisected humerus.

It shows the accumulation of the minute cancellous structure at the extremities, and the progressive thickening of the outer compact bone as it passes to the shaft, where it forms exclusively the walls of the medullary cavity. At the proximal end may be discerned the linear trace of the primary separation of the epiphysis formed by the great tuberosity; that of the epiphysis formed by the articular head is less conspicuous. At the distal end may likewise be discerned the linear trace of the confluence of the epiphysis with that plate of compact substance which separated the olecranal from the coronoid fossæ.

Hunterian.

5789. A radius, longitudinally bisected.

The compact wall is scarcely defined at the bicipital tuberosity. It is thickest at the convex side of the middle of the bent shaft.

Prepared in 1851.

5790. An ulna, longitudinally bisected.

The compact wall is thick where it forms the bottom of the great sigmoid cavity.

Prepared in 1851.

5791. The scaphoïdes, longitudinally bisected. *Prepared in* 1851.

5792. The os magnum, longitudinally bisected. *Prepared in* 1851.

5793. A metacarpal bone, longitudinally bisected.

The compact walls of the medullary cavity are proportionally very thick. The canal for the medullary artery enters at the middle of the concave surface of the bone, and extends obliquely proximad.

Prepared in 1851.

5794. The proximal phalanx of the middle finger, longitudinally bisected.

This is also remarkable for the thickness of the compact walls of the medullary cavity.

Prepared in 1851.

5795. The right os innominatum, with the ilium, longitudinally bisected.

The compact walls are thickest above the great ischiatic notch.

Hunterian.

5796. The right ilium of a young Child, longitudinally bisected.

It shows a larger proportion of the cancellous structure than in the adult.

Hunterian.

5797. The left os innominatum, longitudinally bisected, through the cotyloid cavity.

A thick stratum of diploë or cancellous texture is included between the compact inner and outer plates of the ilium, of which the outer is the thickest: they recede from each other towards the acetabulum, where the cancellous structure is more abundant, except at its lower half, where it is almost absent. The compact wall of the pubis is very thin, and includes a light and delicate cancellous texture.

Hunterian.

5798. The left os innominatum, transversely bisected through the cotyloid cavity.

The compact wall of the cavity is thickest at the rim.

Hunterian.

5799. The hinder moiety of a right femur, longitudinally bisected.

At the proximal end may be discerned a trace of the confluence of the epiphysial head with the neck, and a similar trace may be followed across the base of the great trochanter. The columnar cancelli are arranged in decussating curves, like the arches in Gothic architecture, where they transfer the weight sustained by the head and neck of the bone upon the strong and compact shaft: here the dense tissue is disposed as a hollow column and forms the walls of a medullary cavity: this is gradually obliterated by fine cancellous structure towards the distal end, where the compact wall progressively diminishes in thickness: scarcely any trace of the confluence of the epiphysis can be discerned at this extremity of the bone.

Hunterian.

5800. The left femur, longitudinally bisected. *Hunterian.*

5801. The proximal part of a left femur, longitudinally bisected.

A tract of cancellous structure, more compact than the rest, extends from the middle of the head to the under part of the neck.

Hunterian.

5802. The proximal part of a left femur, from the fore part of which a section has been obliquely removed, passing through the middle of the head. *Hunterian.*

5803. Half of the longitudinally bisected proximal end of the femur, from which a great proportion of the animal matter has been removed, leaving the earthy part, and showing very clearly and beautifully the mechanical arrangement of the walls of the cancelli. *Presented by Edward Stanley, Esq., F.R.S.*

5804. Two portions of a longitudinally bisected shaft of a femur, similarly prepared. *Presented by Edward Stanley, Esq., F.R.S.*

5805. A longitudinal slice from the distal end of a femur similarly prepared, showing with great clearness the delicate and elegant reticular arrangement of the fine columnar and lamellar walls of the cancelli.

Presented by Edward Stanley, Esq., F.R.S.

5806. The hinder half of the left tibia, longitudinally bisected.

The line of confluence of the proximal epiphysis may be readily traced, and divides the finer cancellous texture of the articular expansion from the coarser texture of the shaft below. The inner compact wall of the medullary cavity is thicker than the outer one. The epiphysial line is traceable across the distal cancellous structure.

Hunterian.

5807. A fibula, longitudinally bisected.

The line of the obliterated harmonia between the shaft and the epiphysis is plainly shown at both extremities of the section.

Prepared in 1851.

5808. An astragalus, longitudinally bisected. *Prepared in* 1851.

5809. A calcaneum, longitudinally bisected.

The compact wall is thickest where it forms the larger articular surface for the astragalus, and from this part the principal septa of the cancelli radiate towards the back and under part of the bone. The cancelli are largest in the anterior half.

Prepared in 1851.

5810. The metatarsal of the hallux, or great toe, longitudinally bisected.

Prepared in 1851.

5811. The proximal phalanx of the great toe, longitudinally bisected.

Prepared in 1851.

5812. The distal phalanx of the great toe, longitudinally bisected.

A medullary cavity is established in each of these bones.

Prepared in 1851.

5813. The metatarsal of the second toe, longitudinally bisected. *Prepared in* 1851.

The following specimens, to No. 5832 inclusive, illustrate the osteogeny and progressive growth of the Human skeleton :—

5814. The skeleton of an embryo of six weeks.

It shows the early ossification of the hæmal arches and appendages: this is exemplified in the upper jaw, the lower jaw, the clavicles, the scapulæ, the thoracic ribs and the innominata. A single bony ray indicates respectively the humerus and femur: two rays represent the radius and ulna in the arm, and the tibia and fibula in the leg, the two latter being of equal thickness. Ossification has commenced in the occipital and frontal spines, but the neural arches of these and of the other vertebral segments are unossified.

This specimen was originally part of the Sloanian Museum.

Mus. Brit.

5815. A Fœtal skeleton, one inch and a half in height. *Mus. Heaviside.*

5816. A Fœtal skeleton of two inches and a half in height.

It shows partial ossification of the metacarpals, of the metatarsals, and of the proximal and distal phalanges. The neurapophyses of the cervical vertebræ are, also, now ossified.

Hunterian.

5817. A Fœtal skeleton, a little further advanced. *Mus. Heaviside.*

5818. A Fœtal skeleton, four inches in height.

The neurapophyses of the dorsal and lumbar vertebræ have begun to be ossified, and the middle phalanges of the fingers of the hand.

Mus. Heaviside.

5819. A Fœtal skeleton, four inches and a half in height. *Mus. Heaviside.*

5820. A Fœtal skeleton, five inches and a half in height.

A centre of ossification is established in the body of each of the trunk-vertebræ.

Mus. Heaviside.

5821. A Fœtal skeleton, seven inches in height. *Hunterian.*

5822. A Fœtal skeleton, nine inches in height.

The pleurapophysis or costal element of the seventh cervical is ossified and distinct.

Mus. Heaviside.

5823. A Fœtal skeleton of nearly ten inches in height.

The costal elements, or pleurapophyses, of the seventh cervical vertebræ are ossified.

Hunterian.

5824. A Fœtal skeleton, eleven inches in length. *Hunterian.*

5825. A Human skeleton, sixteen inches in length, being that of a fœtus of nine months, or of a child at birth.

The pleurapophyses of the seventh cervical are large and distinct, and the same elements are represented by distinct ossifications in the ligament connecting the par- with the di-apophyses in some of the other cervical vertebræ. The corresponding elements may be observed ossified in some of the sacral vertebræ.

Presented by Sir William Blizard, F.R.S.

5826. The skeleton of a fully developed Fœtus or Child at birth, measuring seventeen inches in length. *Hunterian.*

5827. The skull of a Child at birth. *Hunterian.*

5828. The skull of a Child at birth.

The dried membranes are preserved which close the vacuities called fontanelles.

Mus. Brit.

5829. The skull of a Child at birth, vertically and longitudinally bisected.

A part of the dried integuments and the dura mater are preserved, showing the falx and tentorium.

Prepared in 1851.

5830. The skeleton of a Boy, about two years of age. *Mus. Brit.*

5831. The skeleton of a Boy, about twelve years of age. *Mus. Brit.*

5832. The skeleton of an adult male European. *Hunterian.*

The following, to No. 5876 inclusive, illustrate the dental system, its changes and development, in Man:—

5833. A section of the Human skull, including the upper and lower jaws, from the right side of which the teeth have been extracted, and are displayed separately.

Their nature is indicated by their symbols:—*i* 1, *i* 2, the incisors; *c*, the canine; *p* 3, *p* 4, the bicuspids, answering to the third and fourth premolars of the typical series; *m* 1, *m* 2, *m* 3, the first, second and third molars. The prominence of the nasal bones, verticality of the alveolar part of the upper jaw, and moderate size of the molar teeth, indicate this specimen to be from a European, and probably an Englishman. In one premolar of the upper jaw the two fangs are distinct; in the other premolars they are connate. The first molar of the upper jaw has three diverging fangs, that answering to the outer fang of the premolar being bifid: in the second and third upper molars the divisions of the corresponding fang are connate: the lower molars are implanted by two fangs each. Compare this insertion of the molar teeth with the more complex insertion of the molars in the Australian skull (No. 5316). The present, or a similar preparation, is figured in Hunter's Work 'On the Teeth,' pl. iii. figs. 1 & 2.

Hunterian.

5834. A section of the Human skull, including the left halves of the upper and lower jaws, from which the outer walls of the alveoli have been removed.

The first molar above is implanted by three roots, the second molar above and the first below by two roots, one external to the other in the former, one behind the other in the latter: in the other molars the fangs are connate. A small osseous excrescence projects from the inner alveolar wall of the third molar of the upper jaw.

Mus. Brookes.

5835. The upper and lower jaws of a Child which has acquired the deciduous series of teeth and the first molars of the permanent series. The roots of the teeth in place and the crowns of the successional teeth are exposed by the removal of the outer alveolar walls.

The nature of the teeth exposed is indicated by their symbols:—*d i*, *d i*, the deciduous incisors; *d c*, the deciduous canine; *d* 3, *d* 4, the deciduous molars, answering to the third and fourth in the typical series; these illustrate the deciduous formula in Man, viz.— $i\,\frac{2-2}{2-2}$, $c\,\frac{1-1}{1-1}$, $m\,\frac{2-2}{2-2}=20$. The permanent teeth in course of calcification are:—*i* 1, *i* 2; *c*; *p* 3, *p* 4; *m* 2: *m* 1 is in place and requires only the completion of the fangs; the matrix of *m* 3 has not begun to be calcified. The outer part of the root of *m* 1 bifurcates and diverges like the corresponding roots of *d* 4 and *d* 3, and, save in size, it more closely resembles *d* 4 than *m* 2.

This elegant preparation was made for John Hunter by his Pupil William Lynn, afterwards President of the Royal College of Surgeons.

Hunterian.

The following specimens, to No. 5856 inclusive, illustrate the formation and succession of the Human teeth, and are preserved on an ingenious moveable stand, invented by John Hunter, in whose Work 'On the Teeth' they are figured:—

Hunterian.

5836. (1.) The right halves of the upper and lower jaws of a Fœtus of five months, showing the common alveolar groove which lodged the formative matrices of the teeth.

The inner wall of the groove is most developed: rudiments of the partitions appear at the bottom of the anterior alveoli.

Op. cit. pl. viii. figs. 1 & 2.

5837. (2.) The left halves of the upper and lower jaws of a Fœtus of seven months, showing the development of the inner wall to an equality with the outer wall of the alveoli, and the more or less completed partitions of the sockets of the incisors and canines.

Op. cit. pl. viii. figs. 3 & 4.

5838. (3.) The left halves of the upper and lower jaws of a Fœtus of eight months, showing the more nearly completed sockets: a large vacuity still remains in the partition between those of the two molars.

Op. cit. pl. viii. figs. 5 & 6.

5839. (4.) The right ramus of the lower jaw of apparently the same Fœtus: the calcified germs of the two incisors and the canine are displayed *in situ*: similar germs, with the calcified summits of the pulps, of the two deciduous molars are separately displayed.

5840. (5.) The lower jaw of a new-born Infant, or fœtus of nine months.

The two mid-incisors have cut the gum: the crowns of the outer incisor, canine, milk-molars, and first true molar, may be seen through the openings of the formative sockets, which openings are contracted above the molars.

Op. cit. pl. viii. fig. 8.

5841. (12.) The left ramus of the lower jaw of a new-born Infant, or fœtus of nine months.

The mid-incisor has cut the gum: the crowns of the outer incisor, canine, milk-molars and first true molar are exposed by the removal of the outer alveolar wall: the calcified summits of the permanent incisors and canine are exposed by the removal of the inner alveolar wall. The dried remains of the gum remain above the formative alveoli of the undeveloped teeth.

5842. (12.) Part of the right upper jaw of a new-born Infant.

The mid-incisor is beginning to cut the gum: the crowns of the outer incisor, canine, two milk-molars, and the calcified summit of the first true molar and of the permanent mid-incisor, are exposed by removal of the inner wall of the alveoli.

5843. (7.) The left upper jaw of a young Infant.

The mid-incisor, and apparently the second incisor, which is lost, have cut the gum: the crowns of the canine and milk-molars are seen in the formative sockets. The formative sockets of the permanent incisors are shown, and also that of a canine, or supernumerary tooth, behind them, with the calcified germ of the tooth in an inverted position, the point being directed upwards against the bony palate, and the pulp-cavity opening towards the gum. The maxillo-premaxillary suture remains on the palate and on the inner surface of the nasal passage.

Op. cit. pl. viii. fig. 9.

5844. (10.) The right upper jaw of apparently the same Infant.

The two incisors have cut the gum. The germ of a corresponding canine, or supernumerary tooth, is shown in a similar inverted position.

5845. (8.) A section of the right upper jaw of a young Infant.

The two incisors have cut the gum: the crowns of the canine, milk-molars and first true molars are exposed by the removal of the outer alveolar wall, and the germs of the permanent incisors by the removal of the inner alveolar wall.

5846. (9.) A section of the lower jaw of a Child.

It shows the mid-incisor and first milk-molar, and the sockets of the intervening outer incisor and canine, from which the teeth have been removed. The formative alveoli of the permanent mid-incisor and of the first bicuspid are also shown.

Two views of this preparation are given in the Work 'On the Teeth,' pl. ix., in which Hunter's description of fig. 2 is, "The *incisor* of the child is standing in its socket, and the

adult *incisor* forming in a distinct socket, underneath:" and of fig. 3, "to show that the bicuspides are formed in distinct sockets of their own, and not in the socket of the grinder, which stands above."

5847. (11.) The left upper maxillary bone of a Child.

The two milk-molars are in place: the canine has been removed from its socket, and the premaxillary part of the jaw removed to expose the germ of the permanent canine in its formative socket. The germs of the first bicuspid and first true molar are similarly exposed from the inner side. The crowns of an incisor and canine are separately displayed.

5848. (6.) A section of the right upper maxillary bone of a Child.

The two milk-molars are in place. The deciduous incisors and canine have been removed; behind their sockets the calcified summits of the permanent incisors may be seen through the wide gubernacular openings. The crown of the first true molar may be seen in its formative socket.

5849. (13.) The left maxillary and left ramus of the mandible of a Child, in which the deciduous teeth had been acquired and the first true molar was beginning to rise into place, being more advanced in the lower than the upper jaw.

The germs of the successional teeth and of the second true molars are exposed by the removal of the outer walls of their formative alveoli.

These preparations are figured (reversed) in pl. ix. fig. 1. *Op. cit.*, with the following description: "One side of the Upper and Lower-jaw of a subject about eight or nine years of age, where the *Incisores* and *Cuspidati* of the *Fœtus* were shed, and their successors rising in new sockets; shewing likewise the two Grinders of the child, with the *Bicuspides* forming underneath. The first adult Grinder was ready to cut the gum; and the Second Grinder in the Lower-jaw is lodged in the root of the coronoid process, and in the Upper-jaw it is in the tubercle."

5850. (14.) The left maxillary and a considerable proportion of the mandible of a Child, at the same stage of dentition as the foregoing.

The second milk-molar is in place in the upper jaw: the alveoli of the antecedent milk-teeth have been removed to expose those containing the calcified crowns of the permanent incisors, canine, and first bicuspid. The first true molar is exposed in its socket, and that of the second true molar is shown behind. In the lower jaw the two milk-molars on each side are left standing: the crowns of the four permanent incisors, canines, and anterior bicuspids are exposed by the removal of the front walls of their formative sockets. The crowns of the second bicuspids seem not to have begun to be calcified.

5851. (15.) The back part of the left ramus of the same lower jaw. It shows the widely open alveolus of the first true molar, the crown of which is there exposed; and the formative socket of the second true molar.

5852. (15.) The right ramus of the lower jaw of a Child.

The deciduous series, viz. two incisors, a canine, and two molars, are in place: the formative sockets of the successional teeth and of the first and second true molars are exposed from the inner side. The matrices of the second bicuspid and second true molar had not begun to be calcified.

5853. The left rami of four lower jaws, of Individuals at different periods of life.

The youngest shows the five deciduous teeth in place: the next shows the two permanent incisors, the deciduous molars, and first true molar; the second true molar rising into place, and the permanent canine exposed in its formative socket: the third shows the permanent incisors, canine, bicuspids, and first and second true molars in place, all the deciduous teeth having been shed: the fourth shows the full permanent series.

These specimens are the subjects of fig. 2. pl. xvi. *Op. cit.*, where they are represented larger than natural, and are thus described:—"Fig. 2. Four Lower-jaws at different periods of life, from the age when the five shedding teeth are completely formed, to that of a complete set. This figure shows four things: 1. The lengthening of the jaw backwards, which is seen by the oblique line made by the four condyles; 2. The gradual rise of the two processes above the line of the teeth; 3. The gradual increase of the teeth in proportion as the jaw lengthens; And, 4. The part formed, always keeping the same size."

5854. Sections of the right halves of the upper and lower jaws, with the outer alveolar wall removed to expose the implanted roots of the teeth.

This specimen is the subject of fig. 1. pl. vi. *Op. cit.*, in the description of which Hunter remarks:—"The length of each fang is at once seen with respect to its neighbour, and this kind of articulation" (gomphosis) "pointed out at one view."

5855. The left upper maxillary bone, in which the canine is exposed in its socket, the crown not having been protruded beyond the opening of the sockets of the contiguous teeth.

This specimen is the subject of fig. 8. pl. viii. *Op. cit.*, and is described as follows:—"A sketch of an Upper-jaw where the *Cuspidatus* of that side had been formed high up in the Jaw, and, therefore, never would appear through the Gum."

5856. The fore part of a Human lower jaw, showing the incisors, canines, and bicuspids, with their crowns worn down to a flat surface.

The following specimens, illustrative of the structure, development and succession of the Human Teeth, are arranged on slides, in a glazed frame or case, and are figured in John Hunter's Work 'On the Teeth.'

Hunterian.

5857. The teeth on this slide are the subjects of Plate v. *Op. cit.*, where they are described as follows:—

" The sixteen teeth from one side of both jaws, taken out of their sockets to expose the whole of each tooth.

" Row 1.—The teeth of the lower jaw; the five single are similar to those in the upper jaw, but the grinders in this have only two fangs.

" (*a. a.*) The two incisors.

" (*b.*) The cuspidatus; showing, in the same view, how much longer it is than the others.

" (*c. c.*) The bicuspides.

" (*d. d.*) The first two grinders, having two fangs.

" (*e.*) The third grinder, or dens sapientiæ, having also but two fangs.

" Row 2.—The teeth of the upper jaw; the lettered references apply to this, as to the first row.

" (*a. a.*) The two incisors, showing the hollowed inner surface of the body of those teeth.

" (*b.*) The cuspidatus, showing the same.

" (*c. c.*) The bicuspides, showing the two points on the basis of each. The first of them has a forked fang.

" (*d. d.*) The first two grinders having three fangs.

" (*e.*) The third grinder, or dens sapientiæ, having also three fangs."

5858. A slide supporting sections of the teeth of Man, the Horse, and the Elephant, which have been subjected to the action of fire in order to show more clearly the distinction between the enamel and other constituents of the teeth; the minute quantity of animal matter in the enamel not affecting its colour when heated. Most of the specimens are figured in plates xiv. & xv. *Op. cit.*, where they are described as follows:—

" (*a.*) Fig. 17.—An incisor slit down its axis, to show the enamel upon the body of the tooth, covering much more of the convex than of the concave part."

" (*b.*) Fig. 18.—An incisor, worn so much down as to expose the whole end of the bony part, a circle only of enamel remaining."

"(*c.*) Fig. 16.—A cuspidatus, showing the same circumstance."

"(*d.*) Fig. 15.—A lateral view of the enamel of a bicuspis cut longitudinally."

"(*e.*) A similar view of the enamel of a molaris."

"(*f.*) Fig. 14.—Another view of the enamel of a molaris."

"(*g.*) Fig. 12.—The basis of a molaris whose points were worn down, and the bony part which projected into those points exposed."

"(*h.*) Fig. 13.—A molaris, whose bony part is wholly exposed, and only a circle of enamel left, covering the sides all round."

"(*i.*) Fig. 20.—The grinding surface of a Horse's molaris, to show the irregular course of the enamel."

(*j.*) A section of one of the denticuli of an Asiatic Elephant's molar, showing the dentine, enamel and cement. Only a very small proportion of the dentine or 'bony part' appears in this section: it is enclosed in the enamel.

(*k.*) A horizontal section of the molaris of a Horse, to show the course of the enamel. Both the dentine and cement are blackened by the action of fire.

5859. (Slide 4.) A series of Teeth in longitudinal section, to show the size and shape of their pulp-cavities.

Three are canines, two bicuspids, and two molars. There are also two transverse sections of fangs, the crown of a molar not fully developed, and an upper molar with a large concretion of tartar attached to it.

5860. (Slide 5.) Longitudinal and transverse sections of Human permanent teeth.

a. a. The incisors.

b. The canine.

c. A premolar or bicuspid, showing, by the double pulp-cavity, that the apparently single fang consists of two connate fangs.

c'. A premolar, in which the two fangs are distinct at the lower half of the root.

d. A molar, showing, by the double pulp-cavity of one of its apparently single fangs, that this consists of two connate fangs. (The above are the subjects of figs. 1–5 of pl. xiv. *Op. cit.*)

e. A molar, with the pulp-cavity exposed in the crown, and one of the fangs broken away.

f. A molar, showing the divisions of the pulp-cavity continued into the diverging fangs.

g. A transverse section of the crown of a molar, showing the part of the pulp-cavity next the grinding surface.

h. A transverse section of the crown of a molar, showing the part of the pulp-cavity next the fangs. (The two preceding specimens are the subjects of figs. 8 & 9, pl. xiv. *Op. cit.*)

i. This specimen is the subject of fig. 7. pl. xiv., where it is thus described: "A molaris of the lower-jaw, with part of its fangs sawed off, to show that the sides of the cavity or canal have grown together, and divided it into two small canals, which are represented by two dark points." In other words, the two seemingly single fangs consist each of two connate fangs.

5861. (Slide 6.) A series of the deciduous teeth of a Child "from their being complete to their utmost decay:" there is also a deciduous incisor of a Horse, with the germ of the permanent incisor about to succeed it.

The Human teeth are the subjects of figs. 2 and 3. pl. xv. *Op. cit.*

5862. (Slide, Div. 7.) "The teeth of one side of both jaws, from a Child of five or six years of age."

The deciduous incisors are completed, and the crowns of their successors formed. The fang of the deciduous canine is not quite complete, and the crown of the successor is about half-formed. The fangs of the first milk-molars are nearly completed, and the summit of the first upper premolar has begun to be calcified. The fangs of the second milk-molar are half-formed and widely open: the second premolar has not begun to be calcified. The crown of the first true molar is more than half-formed.

These are the subjects of fig. 1. pl. x. *Op. cit.*

5863. (Slide, Div. 8.) "The teeth of one side of both jaws, from a Child of seven years of age."

The fang of the first deciduous incisor is partially absorbed, more in the upper than the lower tooth: part of the fang of the succeeding incisor is formed. Of the second incisor a smaller proportion of the fang of the deciduous tooth is absorbed, and of that of the permanent one is developed. The whole of the deciduous canine, and of the crown of the permanent one, are completed. The fangs of the upper milk-molars are more absorbed than those of the lower ones, and the crowns of the upper premolars are proportionally more advanced. The whole of the crown with the beginning of the root of the first true molar is now formed. These teeth form the subjects of fig. 2. pl. x. *Op. cit.*, and in the description of the plate the Author remarks, "This is an age in which there are more teeth formed and forming than at any other time of life:—forty-four in the whole."

5864. (Slide, Div. 9.) "The teeth from one side of both jaws of a Child eight or nine years old, principally to show the progress of the second set and the beginning and decay of the first set."

The first deciduous incisor of the lower jaw has been shed, and the crowns of the second permanent molars have been formed. The fangs of the first true molars are more lengthened, and those of the milk-molars more absorbed.

These teeth form the subjects of fig. 1. pl. xi., and, according to Hunter's own showing, a greater number of formed and forming teeth coexist in the jaws of a child at the age here exemplified than at that characterized by the teeth in No. 5863. As the crowns of the second true molars are always more or less calcified before any of the deciduous incisors are shed, the

number of "formed and forming" teeth in the jaws at such period, commonly from seven to eight years of age, is 48: viz. 20 deciduous teeth, 20 permanent successors, and 8 superadded true molars.

5865. (Slide, Div. 10.) "The teeth from one side of both jaws of a Youth about eleven or twelve years old, showing the further progress of the one set towards perfection, and of the other towards decay."

The deciduous incisors and canines have been shed, and the permanent ones have cut the gum. The fang of the canine is not yet complete. The second incisors have not been preserved in this series. The first upper premolar has come into place and has pushed out its predecessor: the first lower milk-molar and the second in both jaws remain, with their fangs much absorbed. Only the base of the fangs of the premolars is formed: the first true molars have the fangs nearly complete: the enamel seems to have been dissolved away from the summit of the crown by an acid. The crown of the second true molar is complete: that of the third, or 'dens sapientiæ,' is only beginning to be calcified. The above teeth form the subjects of fig. 2. pl. xi. *Op. cit.*

5866. (Slide, Div. 11.) The teeth from one side of both jaws of a Youth about fourteen years of age.

The permanent incisors and canines are in place; but the deciduous molars have not been shed: their fangs are much absorbed and those of their successors are half-formed; the fangs of the second true molar are in a similar state, and the crown of the third true molar is more advanced, especially in the upper jaw.

5867. (Slide, Div. 12.) The teeth from one side of both jaws of a Youth about eighteen years of age.

The premolars or bicuspids are complete and have pushed out the milk-molars, all the deciduous series being now shed. The fangs of the second true molar are complete in the lower jaw, but not in the upper jaw. The third true molar shows a corresponding advance of development in the lower jaw.

5868. (Slide, Div. 13.) The calcified summits of the crowns of the deciduous teeth, viz. two incisors, canine, and two molars, "from one side of both jaws, of a Fœtus of seven or eight months, showing the progress of ossification:" this is greatest in the first incisor and decreases to the last molar.

The specimens are the subjects of fig. 4. pl. ix. *Op. cit.*

5869. (Slide, Div. 14.) The calcified portions of the crowns of the deciduous teeth, from one side of both jaws, of a Fœtus of the ninth month. (Fig. 5. pl. ix. *Op. cit.*)

5870. (Slide, Div. 15.) The deciduous mid-incisors, canines and molars, with the calcified summits of the crowns of the permanent second incisors, and first molars, from one side of both jaws, of a Child eight or nine months old.

These specimens are included in the fig. 6. pl. ix. *Op. cit.*, of the entire series, which are described as "the five temporary teeth in a more advanced state, with the first adult grinder. The adult incisors and one cuspidatus are also begun to be formed :" but, by an error of the press, 'years' is given for 'months' in the description of the plate. In the text the specimens are rightly ascribed to an infant of eight or nine months.

5871. (Slide, Div. 16.) The moieties of longitudinally bisected deciduous and permanent incisors at four stages of their development, showing "the gradual growth of the body, fangs, and cavity:" the lower row is of the permanent set. (Fig. 2, *a*, *b*, *c*, *d*, pl. xiii. *Op. cit.*)

5872. (Slide, Div. 17.) The moieties of longitudinally bisected deciduous and permanent molars at three stages of growth. The pulp-cavity is relatively larger in the completed deciduous than in the completed permanent molar. (Fig. 2, *e*, *f*, *g*, pl. xiii. *Op. cit.*)

5873. (Slide, Div. 18.) Eight specimens of permanent incisiors at different stages of development.

These are the subjects of fig. 8. pl. xiii. *Op. cit.*, where they are described as "showing the gradual growth of a single tooth, from its first formation nearly, to its being almost complete :" some of the specimens, however, are of the first incisor, some of the upper, some of the lower incisors.

5874. (Slide, Div. 19.) Six specimens of the first true molar of the lower jaw.

"They show the formation of the cavity and fangs of the molares of the lower jaw.

"(*a.*) Shows the common cavity in the body of the tooth.

"(*b.*) Shows the cavity still deeper.

"(*c.*) Shows the bony arch thrown over the mouth of the cavity, and dividing that into two openings, which give origin to the two fangs.

"(*d, e, f.*) Show the progress of these fangs." *Op. cit.* pl. xiii. fig. 1. A, *a*, B, C, D, E.

5875. (Slide, Div. 20.) Five specimens of the first true molar of the upper jaw, similarly displayed.

"(*g.*) Shows the common cavity of the tooth.

"(*h.*) Shows the slight tucking in of the mouth of the cavity, at three different points, from which three ossifications shoot.

"(*i.*) Shows these ossifications, and the beginning of three fangs.

"(*k, l.*) Show the gradual growth of these fangs." *Op. cit.* pl. xiii. fig. 1. A, *a*, F, G, H, I, K.

5876. A premolar or 'bicuspid,' longitudinally bisected, of a Man.

Presented by Sir Everard Home, Bart., F.R.S.

The following specimens, to No. 5885 inclusive, exhibit the relations of the Human skeleton to the archetype of the Vertebrate skeleton :—

5877. The first dorsal segment of the skeleton of a Human Fœtus.

It shows :—*c*, the centrum ; *n*, the neurapophyses ; *pl*, the pleurapophyses ; *hs*, the hæmal spine,—all distinct elements of the segment at this period :—the hæmapophyses are unossified.

Presented by Prof. Owen, F.R.S.

5878. The sixth cervical segment of the same skeleton.

It shows :—*c*, the centrum ; *n*, the neurapophyses, and *pl*, the pleurapophyses. That of the right side is left in its natural connections with the diapophysial process of the neurapophysis : it is a slender, short bony bar, thickest at its outer end ; it forms the lower boundary of the canal for the vertebral artery, and when coalesced, the pleurapophysial part of the transverse process.

Presented by Prof. Owen, F.R.S.

5879. The last two dorsal, with the lumbar and sacral segments, or vertebræ, of the same skeleton.

The pleurapophyses of the eleventh and twelfth dorsals are ossified. The diapophyses of the lumbar vertebræ show the same well-defined terminal flattened surface, as those of the dorsals for the costal articulation, but only the cartilaginous bases of the pleurapophyses have been preserved. In the first and second sacral vertebræ, a distinct osseous centre has been established in the cartilaginous basis of the pleurapophysis, which occupies the same relative position as in the cervical vertebræ : these costal elements are, however, much thicker in

proportion to their length, and thereby fill up the interspace between the centrum and the diapophysis. The neural spines remain as yet unossified; the neural arch is incomplete: the cartilaginous basis of the spine is preserved in some of the lumbar vertebræ. In the second and third sacrals, ossification extends a shorter way into the neurapophysis, leaving the canal more widely open.

Presented by Prof. Owen, F.R.S.

5880. The bones of a Fœtal skull, separated, and artificially connected with each other.

They are numbered on coloured labels to correspond with the TABLE OF SYNONYMS.

The elements of the neural arch of the occiput (1, 2, 3) are distinct: the paroccipital is an exogenous prominence of the exoccipital (2). The bodies of the two cranial segments or vertebræ, in advance (5, 9), are anchylosed together and with the neurapophyses (10) of the third segment. The neurapophyses (6) of the second vertebra are still distinct. The neural spines of each of these three segments are likewise distinct; that of the occiput (3) being partially bifid, those of the parietal (7) and frontal (11) segments entirely so. The elements of the neural arch of the nasal segment (13, 14, 15) are similarly distinct. Of the hæmal arch of this segment the spine (22) is bifid, and each moiety has partially coalesced with the hæmapophysis (21), which is modified for the lodgment of teeth. The germs of some of these, including the two incisors and the two molars, are displayed on the left side. The diverging appendage of this arch includes three bones, one (24) serving to attach the arch to a succeeding segment (6); a second (26) modified to aid in forming the orbit; the third (27) to aid in completing the lateral walls of the immensely expanded neural canal. The diapophysis of the parietal segment (8) is autogenous, but has coalesced with the bony capsule of the organ of hearing (16). The pleurapophysis of the frontal segment (28) is separated from that segment by the intervention of part of the expanded diverging appendage (27) of the maxillary arch: it consists of a slender bar of bone bent almost into a circle: the rest of the hæmal arch of this segment is modified to support teeth, and forms what is called 'the lower jaw.' The specific names which the other elements of the cranial segments have received in consequence of their adaptive modifications will be seen by reference to the Numerals in the TABLE OF SYNONYMS corresponding with those in the text.

Purchased.

5881. The separated bones of the Fœtal skull.

They are numbered on coloured labels to correspond with the TABLE OF SYNONYMS.

Mus. Heaviside.

5882. A Fœtal skull, from which the moiety of the bifid spines of the frontal (11) and nasal (15) vertebræ have been removed to show the relations of their centrums (9 & 13) and neurapophyses (10 & 14) to their respective hæmal arches (20—22 & 28—32).

The individual bones have been numbered on coloured labels according to the TABLE OF SYNONYMS.

Presented by Prof. Owen, F.R.S.

5883. The bones of the skull of a Child of seven years of age, with the milk teeth and first permanent molars in place.

The elements of the neural arch of the occipital vertebræ (1-3) have coalesced, forming the 'occipital bone' of Anthropotomy. The neurapophyses (6) of the parietal vertebra have coalesced with the centrum (5), and the union of this with the centrum (9) and neurapophysis (10) of the frontal vertebra, as also with the pterygoid appendages (25) of the maxillary arch, constitutes the complex 'sphenoid bone' of Anthropotomy.

The two moieties of the bifid spine (7) of the parietal vertebra still continue distinct. The moieties of the frontal spine (11) have coalesced.

The body of the nasal vertebra (13) remains distinct, and constitutes the 'vomer' of Anthropotomy. The neurapophyses (14) have coalesced with each other and with part of the capsules of the organ of smell, forming the 'æthmoid bone.' The moieties of the bifid spine (15) continue distinct and form the 'nasal bones.'

The germs of the second series of teeth are exposed in their formative alveoli, with the exception of the last true molars, which have not begun to be calcified. The symbol attached to each tooth indicates its homology according to the Table of the typical dentition in the TABLE OF SYNONYMS. The distal element of the diverging appendage of the maxillary arch (27), the diapophysis of the parietal vertebra (8), the pleurapophysis of the frontal vertebra (28), and the osseous capsule of the organ of hearing (16), have coalesced to constitute the complex 'temporal bone' of Anthropotomy, minus the pleurapophyses of the parietal vertebra, which have not yet become anchylosed as the 'styloid processes' of that bone.

Purchased.

5884. The neural arches of the three posterior cranial vertebræ.

The sutures between the centrum (1) and neurapophyses (2) of the occipital vertebræ are still retained; but the spine (3) has coalesced with its neurapophyses. The neurapophyses (6 & 10) of the parietal and frontal vertebræ have coalesced with their respective centrums (5 & 9), which are likewise confluent: the moieties of the originally bifid spine (11) of the frontal have coalesced together.

In this specimen is shown the vacuity between the occipital (2) and parietal (6) neurapophyses, which is closed by the intercalated capsule of the organ of hearing (16), together with the diapophysis (8) of the parietal vertebra, and the squamous appendage (27) of the maxillary arch. The peculiarly developed brain of Man requires these accessory parts, even in a greater degree than those mammalia which most resemble Man in the size of the cerebrum.

Presented by Prof. Owen, F.R.S.

5885. The bones of the adult skull separated and artificially connected together.

They are numbered on coloured labels according to the TABLE OF SYNONYMS. The additional confluence, which tends further to mask the common vertebral pattern in the Human skull at this period of life, is that which attaches the pleurapophyses (38) of the parietal vertebra to the acoustic or petrosal capsule (16), and adds an additional feature of complexity to the temporal bone, by giving it the so-called 'styloid processes.'

Purchased.

The five following skulls show the modifications which depend upon extreme age :—

5886. The skull of an aged Female.

The calvarium has been detached, showing the cranial parietes to be thin, with little diploë. The chief modifications are presented by the bones of the face, especially the jaws, in which the alveolar processes have been absorbed, and the lower jaw is reduced to a slender arch of bone. The paroccipital tubercles are defined.

This skull resembles the subject of the figure illustrative of the effects of the loss of teeth in both jaws, given by Hunter in his Work 'On the Teeth,' pl. vii.

Hunterian.

5887. The skull of an aged Male, with the short, broad, rounded type of cranium.

It shows a similar absorption of both jaws, with the thinning and partial absorption of the bony palate.

Presented by Sir William Blizard, F.R.S.

5888. The skull of a similarly aged Male, with the elongated narrow type of cranium. *Hunterian.*

5889. The skull of an aged Female, with the cranium of medium proportions.

In both this and the preceding skull the supramastoid ridges are well marked.

Hunterian.

5890. The cranium of an aged Frenchman.

The mastoids are small, and have each a deep irregular groove externally: the squamosals are likewise unusually small, and the primitive distinction between the mastoid and squamous parts of the temporal is indicated by an unusually deep and well-marked angle between those elements at the additamental suture. The paroccipitals are small, but distinct.

Presented by Dr. Leach, F.L.S.

The following crania have been preserved on account of some individual peculiarities :—

5891. The cranium of a European, with the frontal region narrow, but unusually and unsymmetrically protuberant.

A section of this part shows no undue thickening of the bone; but an accordance of the cranial cavity with the external configuration. The occipital region is prominent. The paroccipital tubercles are small, though distinct. The maxillo-intermaxillary sutures are distinct on the palate. The alisphenoids are unusually broad, and are confluent with the parietals.

Hunterian.

5892. The cranium of a European, with an unusual prominence of the upper half of the superoccipital, accompanied with the development of numerous small wormian bones in the deltoid suture.

The squamosal sends a short narrow process to join the frontal on both sides of the head.

Hunterian.

5893. The cranial part of a skull of a European, with a similar but well defined and more protuberant superoccipital prominence, and the usual lambdoidal wormian bones. *Presented by Dr. Leach, F.L.S.*

5894. The cranium of a European, with a similar, but less circumscribed, occipital protuberance, accompanied with more numerous and larger ossa wormiana, some of which extend into the back part of the sagittal suture.

Presented by Sir William Blizard, F.R.S.

5895. The cranium of an Englishman, with three unusually large wormian bones along the deltoid suture.

The paroccipital tubercles are defined.

Hunterian.

5896. The cranium of an English woman, with the upper half of the superoccipital divided into three similar large wormian bones.

The middle of these answers to the interparietal of some inferior Mammals.

Hunterian.

5897. The skull of a European, in which the coronal and part of the sagittal suture are obliterated, and which is remarkable for the unusually narrow bones of the face and for the production of the jaws downwards and forwards.

The paroccipitals are small, but distinct.

Hunterian.

5898. The cranium of a young Englishman, in whom the compression of the facial bones has been carried to deformity, and is attended with the absorption or non-development of a great part of the alveolar processes of the superior maxillary and with a deficiency in the bony roof of the palate. *Purchased.*

5899. The base of the skull, with the atlas, of an Englishman, showing the same excessive development of the left paroccipital, with its articular surface for the corresponding part of the atlas, as in the skull of the Native of the Philippine Islands (No. 5531). The paroccipital forms a distinct tubercle upon the right side.

The paroccipital is, in many skulls, reduced to a mere "scabrous ridge extended from the middle of the condyle towards the root of the mastoid process" (Monro, On the Bones, 8vo, 1820, p. 72), the "eminentia aspera musculum rectum lateralem excipiens" of Soemmerring (De corporis humani fabricâ, t. i.). The knowledge of its general homology as the diapophysis of the occipital vertebra renders intelligible its occasional development into a process equalling the mastoid in length, and repeating the proportions which it most commonly presents in the inferior mammalia, where it often takes the place of the true mastoid, which in them is suppressed.

Presented by Joseph Toynbee, Esq., F.R.S.

5900. The cranium of a Negress, of the elongate narrow type, with the nasals flattened and the upper jaw produced.

This is chiefly remarkable for the mal-directed growth of the right upper canine, which projects upwards, forwards and inwards into the right nostril.

Hunterian.

5901. The calvarium of a skull, with the short, broad, rounded type of cranium, showing obliteration of the left half of the coronal suture. *Hunterian.*

5902. A cranium, said to be from Madagascar, but with all the characters of the European or English skull.

The molar teeth are small, and much worn. As an individual peculiarity, it exhibits an almost symmetrical pair of smooth hemispheric tubercles on the basioccipital.

Hunterian.

5903. A mutilated cranium which has been subjected to the action of fire, showing the peculiarity of a complete anchylosis of the condyles and basilar part of the occipital, with the corresponding part of the atlas.

The fractured basis of the paroccipitals indicates them to have been unusually developed. The alisphenoid largely articulates with the parietals on both sides: the glabella is little prominent; and the superorbital ridges are thin and well defined. The molar teeth would appear, from the sockets, to have presented the ordinary European proportions and mode

of implantation : in short, there are none of the characteristics of a "Native of Van Diemen's Land" (Osteological Catalogue, 1831, No. 95, p. 16). It may have been brought from that country and have belonged to some settler, murdered and perhaps eaten by the natives.

Presented by Thomas Hobbs Scott, Esq.

5904. The skull of an English Child.

The deciduous molars are not shed : the first true molar is in place in the upper jaw, and both first and second are in place in the lower jaw. The upper canines, as well as premolars, are still concealed in their formative alveoli. The basioccipital and exoccipitals, not having coalesced with the superoccipital, have become detached and lost. This skull is chiefly remarkable for the oblique unsymmetrical deformity of the cranium.

Hunterian.

Varieties of the Human Skeleton in regard to stature.

5905. The skeleton of an Irishman of abnormal stature*.

It measures eight feet, in a straight line from the vertex to the sole, and belonged to the individual who was exhibited, under the name of O'Brian, or Byrne, as the 'Irish Giant.'

The cranium presents the long and narrow form : it is proportionally much depressed, and with a narrow, low, and retreating forehead; the cavity for the brain not exceeding that of a European of ordinary stature: but the upper, and especially the lower, jaws are powerfully developed, the chin being very prominent. The malar bones are moderately prominent. The bones of the rest of the skeleton are well proportioned to the extraordinary height of the individual, with the exception of the bones of the upper extremity, which are relatively shorter. The humerus, which, in the adjoining skeleton, reaches to the labrum of the ilium, in the present does not extend below the last pair of ribs. The metapophyses become distinct upon the eleventh dorsal, and are continued, together with the anapophyses, upon the twelfth

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* The following record of the death of the individual to whom this skeleton belonged is extracted from the 'Annual Register Chronicle,' June 1783, vol. xxvi. p. 209 :—

"In Cockspur Street, Charing Cross, aged only 22, Mr. Charles Byrne, the famous Irish Giant, whose death is said to have been precipitated by excessive drinking, to which he was always addicted, but more particularly since his late loss of almost all his property, which he had simply invested in a single bank note of £700.

"Our philosophical readers may not be displeased to know, on the credit of an ingenious correspondent who had opportunity of informing himself, that Mr. Byrne, in August 1780, measured eight feet; that in 1782 he had gained two inches ; and after he was dead, he measured eight feet four inches.

"Neither his father, mother, brother, nor any other person of his family, was of an extraordinary size."

It has been said, that in his last moments he expressed an earnest desire that his ponderous remains might be sunk out at sea ; but if such were his wish, it was never fulfilled, as Mr. Hunter obtained his body before interment of any kind had taken place.

dorsal and first lumbar, in which, as well as on the second lumbar, the anapophyses are well marked. The diapophyses are unusually lengthened out in the third lumbar, become shorter in the fourth, and very strong and thick in the fifth lumbar. The neural arch is completed over the fifth as well as the preceding sacral vertebræ. The diapophyses of the first coccygeal vertebræ are unusually developed. The neck of the left thigh bone is longer than that of the right.

Hunterian.

5906. The skeleton of a female child of unusually stunted growth, who was exhibited in London, in 1824, as a dwarf, under the name of 'Mademoiselle Crachami*.'

The great fontanelle is unossified. Only the deciduous teeth are in place, of which the first molar above has suffered decay on each side. The right lateral incisor would appear not to have been developed. The maxillo-premaxillary sutures are retained on the palate. The exoccipitals are still distinct from the basioccipital, but have anchylosed with the superoccipital and with the mastoids. The mastoid tubercles are hardly more developed than the paroccipital ones. The neurapophyses of the atlas are ununited above. The so-called body is still unossified. The odontoid and succeeding bodies of the cervical vertebræ are also independent elements. The parapophysial and diapophysial parts of the perforated transverse processes are united by dried cartilage, in all these cervical vertebræ. There is no distinct or ossified costal rudiment observable, the foramen appearing to be completed by continuous ossification of the two exogenous elements above mentioned, both of which are here developed from the neurapophysis. The distinction of the centrum from the neural arch is preserved through the rest of the vertebral column. In the first and second sacrals the costal element of the thick transverse process is distinctly shown. Four centres of ossification have been established in the sternum, one for the manubrium and three for the body of that bone. The bones of the extremities exhibit the usual immature characters.

With this skeleton are preserved casts of the face, of the arm and hand, and of a foot of the same individual.

Presented by Sir Everard Home, Bart., V.P.R.S.

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* See Home, 'Lectures on Comparative Anatomy,' vol. v. p. 191.

THE END.

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